SD
1
.V58
PR

NOVEMBER 1960

Volume 55 Number 12

UN. OF MICHIGAN
OCT 26 1960
FORESTRY LIBRARY

FOUNDED 1905

...nary

...cine

IN THIS ISSUE

HOW I HANDLE SWINE RESPIRATORY PROBLEMS
ARTHROCENTESIS OF THE EQUINE CARPUS
MANAGEMENT OF EGG-BOUND BIRDS
DISEASES OF UNUSUAL PATIENTS
SPECIAL FEATURE—CEREBRAL ANGIOLOGY

Complete Index on Page 5

Are we skating on thin ice?

Back when we were kids, we used to get a kick out of seeing how close we could skate to the edge of a deep hole without getting wet. Skating on thin ice was fun. And if we got too close, all we got was an ice-cold dunking—somebody was always around to pull us out.

Today's practicing veterinarian may be doing the same thing when he buys from a supplier who also sells direct to laymen. He, too, may be skating on thin ice. The danger is if too many skaters do this, they may weaken the ice that supports the whole livestock industry.

The question then is one of degree. How many are "too many"? Where is the breaking point, where do we all fall in? Can we stop short of the water, if enough of us continue to skate on thin ice? We hope so.

For there may not be anyone around to pull us out!

AFFILIATED LABORATORIES CORPORATION

Grain Belt Supply Co.
Corn Belt Laboratories, Inc.
The National Laboratories Corp.
The Gregory Laboratory, Inc.

BENYLIN® EXPECTORANT *for cough relief*

Benylin Expectorant is a combination of approved medical agents which assist in liquefying and removing mucous secretions from the respiratory tract.

USEFUL IN ALL COUGHS AND OTHER SYMPTOMS OF CONGESTION ASSOCIATED WITH THE RESPIRATORY SYSTEM

Benylin Expectorant is available in 16-ounce and 1-gallon bottles.

Not recommended for use in animals supplying milk for human consumption.

Complete information available on request.

PARKE-DAVIS

PARKE, DAVIS & COMPANY
DETROIT 32, MICHIGAN

PARKE, DAVIS & COMPANY, LTD.
MONTREAL 9, QUEBEC

208—1160

Veterinary Medicine

FOUNDED 1905

VOL. 55, NO. 12: NOVEMBER 1960

EDITOR AND PUBLISHER

C. M. Cooper, D.V.M.

ADVERTISING AND BUSINESS MGR.

Lee F. Young, B.A.

PRODUCTION MGR.

Marcia Janes, B.S.

CIRCULATION MGR.

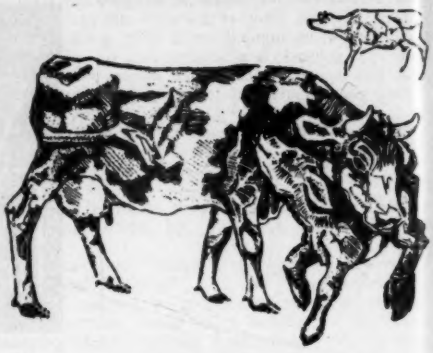
Helen Ramsey

STAFF EDITORS

Carl Graham, D.V.M.
J. B. Herrick, D.V.M.
R. R. Dykstra, D.V.M.
W. L. Sippel, V.M.D., Ph.D.
W. R. Hinshaw, D.V.M., Ph.D.
A. O. Foster, B.A., M.A., Sc.D.

EDITORIAL CONSULTANTS

Robert P. Knowles, D.V.M.
James Archibald, D.V.M., M.V.Sc., Dr. Med. Vet. (Giessen), M.R.C.V.S.
W. O. Brinker, D.V.M., M.S.
William G. Magrane, D.V.M., M. Sc. (Med.)
L. E. Fisher, D.V.M.
Wayne H. Riser, D.V.M., M.S.



LEPTOSPIRA POMONA BACTERIN

Leptospira Pomona Bacterin, Aluminum hydroxide adsorbed, is proven to stimulate immunity against Leptospirosis caused by Leptospira Pomona. Processed by the latest techniques, it is designed to produce organisms in large numbers per cc., and stimulates the production of antibodies in the animal over a longer period of time.

5 cc. dosage is available. It is recommended that the bacterin should be inoculated subcutaneously.

Another product is available in 2 cc. dose.

BIO

Biologicals for Veterinarians
BIO LABORATORIES, INC
50 N. Second St.
Kansas City, Kansas

News Comment

Eggshell Germicide

An eggshell germicide that kills Salmonella bacteria has been reported by Dr. Bert W. Bierer of Clemson College. By washing eggs in a 1% solution of zinc sulfate, the number of Salmonella organisms was reduced experimentally. Preliminary tests show that "rots" and "exploders," a hatchery problem, can be reduced by zinc sulfate, and there appears to be no harmful effect on hatchability.

Dry Lot Feed

Research reports from South Dakota State College indicate that it's less expensive to dry lot feed dairy cows than it is to pasture them or feed them green chopped hay every day. It makes more sense to mechanize dairy feeding operations today than it ever did before and losses of dairy calves from respiratory ailments can be reduced by isolating animals in individual units.

Farm Operation Statistics

Recent reports from Iowa State University suggest that the move to larger farm operations may not be as swift as some predict. They found that large 1,000 acre farms had higher crop production costs than 300 acre farms. Small farms had higher yields also. Something has taken the wind out of the sails of the push for big feedlots too. In 1957, 28% of cattle on feed in Kansas were in large commercial lots. According to a Farm Journal report, this figure was down to 18% this past spring.

Zinc Requirements in Diet

Recent research at Purdue and elsewhere indicates that in chicks and swine, the zinc requirements vary with the source of protein in the diet. The requirements when either soybean oil meal or purified soybean protein was fed were much higher than when animal sources supplied most of the dietary protein. It has been shown that approximately 70% of the phosphorus in soybean protein is in the form of phytic acid. Phytic acid is a chelating agent which has been suggested to be involved in mineral absorption in single stomached animals. Phytic acid in soybean protein has been shown to reduce availability of zinc or interfere with its metabolic function. Parakeratosis is a common deficiency sign.

Brucellosis Eradication

Idaho is the 25th state to qualify as a modified-certified brucellosis area. Certification of New Hampshire as a brucellosis-free area on April 25 marked a major milestone in the fight against the disease, since this was the first time brucellosis had been eliminated from an entire state. The brucellosis eradication campaign has succeeded in reducing the nationwide infection rate by half since 1954.

Drug Control Bill

The drug industry control bill of Secretary Flemming would create the inspection of all facilities and processes of drug manufacturers. Industry would be forced to assume the present government burden of keeping records on clinical experience with new drugs. In July, F.D.A. went ahead with two new proposals of its own. All prescription drug packages and drug sales promotional material will have to contain information about possible hazards. Previously no such information was required provided it was available on request. Also a new drug could be kept off the market pending an F.D.A. investigation of the producers' facilities. The ruling became effective September 20.

Equine Practice

The sudden resurgence of horse practice has created renewed practitioner interest. This series of condensed reviews will cover fundamental technics of equine practice.

Choke

If choke occurs in a young animal, try to leave it alone. They often eat too fast. Attempt to aid relief with arecoline type drugs to stimulate secretions. Other conservative therapy consists of attempting to move the mass with a stomach tube without fluid, to tie the head lower than the knees or to walk the horse around. General anesthesia may relieve choke.

Surgery: It is well to postpone surgical intervention at least 12 hours. Under general anesthesia, pass a stomach tube and make a skin incision six inches above the choke. Bluntly dissect out the esophagus. Bind the esophagus to the stomach tube with gauze and gently pump water against it. If this fails, inject saline into the mass with a syringe and 18 g. needle. Open the esophagus only as a last resort.

Prognosis: Poor if this is necessary.

Prevention: Place some fair sized rocks in the feed box to slow up eating.

Neuroses of Larynx

Etiology: A functional disturbance with no apparent cause. A bilateral paralysis of vocal folds will stop breathing. Nerve involvement may result from toxins, follow infectious disease and possibly damage to the recurrent nerve. Often cause can not be determined.

Signs: There are three types. (1) Spasms of larynx — usually bilateral and come and leave suddenly. Generally caused by excitement. If severe, the animal goes down. (2) Paralysis of muscles. Comes on with excitement also. Animal roars if only one side involved, drops to the ground if bilateral. (3) Disturbed timing when eating. An inspiratory noise is the consistent evidence.

Prognosis: The paralytic type is quite favorable. The true roarer recovers about 85% of the time, 10% show improvement, 4% make no change and 1% get worse.

Treatment: Remove saccules with a Blackburgs or Schnells burr. Incise crico-thyroid membrane. Catch the saccule with the burr. Invert the saccule and cut. Allow the animal strict rest for six weeks to allow adhesions to form. Don't expect results for six weeks or more.

Insert a trachea tube if the condition is bilateral or much swelling occurs.

This procedure is most successful in horses five years or older. Hyperplasia of cartilage frequently occurs in younger animals. Unilateral involvement will be found in 95% of cases and on the left side. This surgery may be done in the standing position but is generally better if the animal can be cast.

Saddle Galls

Etiology: Unequal pressure and friction producing pressure, anemia and necrosis. Some light horses are particularly subject to this condition. Some have faulty conformation such as high or low withers, flat ribs or unusually wide sprung ribs. Irregular training, change of gait, lameness, faulty riding can also contribute.

Signs: Swelling after saddle is removed with itching and pain. The area gets raw with

subacute seroma or hematoma. This area will get thicker if not treated and become quite extensive with even a rib or bone involved.

Prognosis: Favorable if recent and can be treated. May be difficult if thickening has occurred.

Treatment: Alternate cold and hot packs to restore circulation to the area. Rest the horse. The skin callus may be point fired to the depth of the thickening. They should drop off like a corn. If the area involved is large, it can be extirpated but beware of deeper injury.

Prevention: Caution inexperienced owners that a good saddle is essential. Use a saddle blanket to equalize the pressure. It should be springy and light, acting as a cushion. It must absorb moisture without getting hard and rough and allow ventilation. Navaho blankets are good. Saddle up correctly. Keep it in the middle. Place the blanket carefully. Adjust the girth properly, making it snug.

Umbilical Hernia

Etiology: Failure of the umbilical ring to close. Usually inherited. It is seen at birth but may not be noted until later.

Signs: Enlargement and a small or large ring noted on palpation.

Prognosis: Guarded to unfavorable. It may recur, as stomach wall is often weak. Seldom disappears spontaneously.

Treatment: Treat the condition as a yearling. No younger if at all possible. Surgery is the only satisfactory method of correction. Surgery may be closed or open. If readily reducible, closed surgery is best in the horse, but it is often difficult to determine if the hernia has been completely reduced.

Starve the horse for 48 hours with only water. Operate under general anesthesia with animal on its back. Shave and disinfect the area. Palpate and use a clamp to replace the hernia. Suture above the clamp. The hernial sac sloughs off if sutured tight. Permit no exercise for several weeks.

A variation of the closed method is to incise the skin, dissect out the peritoneal sac without opening it. Push it in and suture muscle and skin. This is called the inversion method and works well in small hernias.

In the open method of reduction you can see what is going on. It must be used for hernias that can't be reduced. Principal disadvantage is the possible complication of peritonitis. Using aseptic technic, incise the skin, dissect the sac loose, incise the sac at the top, break down adhesions, return contents to the abdominal cavity, suture the peritoneum using gut suture, suture muscles with interrupted chromic gut (two rows), remove excess skin and suture with silk, using antibiotics.

Cryptorchid Castration

Etiology: Testicle migrates from a position near the kidney to the scrotum in a fold of peritoneum. It may descend before or after birth. A hereditary influence is involved. An ectopic testicle is located outside the canal and is generally someplace under the skin. In a high flanker, the testicle can be palpated high in the canal. The testicle is almost to the external ring in the low flanker.

Signs: Can't feel the testicle in the scrotum, secondary sex traits are increased and the animal tends to be vicious and unmanageable.

Prognosis: Relatively favorable. Not difficult to correct unless previously operated. Poor in old animals.

Surgical procedure: Best age for operation is two year old. The testicle may still descend the second year. Must operate at any age if the animal is vicious.

Withhold solid food for 48 hours. Good restraint essential. A heavy dose of chloral hydrate or suitable anesthetic is important. Don't shave the area or use much water to clean the skin. Cover hocks and feet with a towel. Keep the hands clean. Let someone else initiate restraint under your direction or if necessary to help, wear leather gloves.

joins SULFABROM BOLUSES needs on an exclusive basis

NEW SULFABROM SOLUTION 6.25% AND SULFABROM BOLUSES ARE THE ONLY SULFAS AVAILABLE EXCLUSIVELY TO VETERINARIANS.

Together, these two forms of SULFABROM will supply you with all you require for sulfa treatment—in the field or in your dispensing. Together, they will serve you with greatest efficacy and economy.

PROLONGED ACTION: Ordinary sulfonamides, including sulfathiazole and sulfamethazine, peak during the first 24 hours after treatment, but then soon fall below the necessary or effective 5 mg./100 cc. level. Not so with SULFABROM SOLUTION or SULFABROM BOLUSES. They can establish and maintain therapeutic blood and plasma levels *for as long as 48 hours* in cattle.

DOSAGE AND ECONOMY: Recommended treatment levels with new SULFABROM SOLUTION are 25-50 cc. per 100 lb. of body weight when injected intravenously and 50 cc. per 100 lb. of body weight when injected intraperitoneally. Cost of treatment per animal is remarkably low—only about 50c to $1.

RESULTS: The following remarks are abstracted from actual clinical investigation reports on the use of SULFABROM SOLUTION on file at the Merck Animal Science Research Department. (1) *"Symptoms:* Recently shipped-in cow. Temperature 106°. Labored breathing. Rales audible over chest area. *Diagnosis:* Pneumonia (shipping fever complex). *Treatment:* 700 cc. SULFABROM SOLUTION in one dose daily for two days. Sixty grams of SULFABROM BOLUSES given at time of I. V. injection. *Results:* Temperature returned to normal in 24 hours". (2) *"Symptoms:* Dystocia with removal by forced extraction of putrified fetus. Temperature 104°. Rapid pulse and breathing. Anorexia. *Diagnosis:* Metritis. *Treatment:* Two doses SULFABROM SOLUTION 700 cc. each. *Results:* Temperature 101.6° in 24 hours. Appetite returning". (3) *"Symptoms:* Foul hoof—limited to 'between the toes' variety with swelling. *Diagnosis:* Foot rot. *Treatment:* 700 cc. SULFABROM SOLUTION *Results:* Eight of 11 animals walked normally in 48 hours with swelling reduced to normal or near normal. Three animals required second treatment and returned to normal in 48 hours."

These quoted reports are typical of those being received from clinical investigators and from veterinarians like yourself. We believe they demonstrate that *the only sulfas available to you exclusively*—new SULFABROM SOLUTION and SULFABROM BOLUSES—are also the most effective you can use.

Merck Chemical Division, Merck & Co., Inc., Rahway, New Jersey.

SOLUTION 6.25%

SULFABROM®

(Sodium Sulfabromomethazine) BOLUSES

VETERINARY

MERCK

VM

Practitioner's Laboratory

Diagnostic Significance of Eosinophiles in Secretions and Excretions

WM. L. SIPPEL, V.M.D., Ph.D.
Florida Livestock Board
Kissimmee, Fla.

Large numbers of eosinophiles in secretions or excretions often indicate an allergic cause. The finding of these cells in numbers in abnormal nasal, ocular or salivary secretions or bronchial or intestinal excretions should make the clinician suspicious of an allergy. Moist skin lesions can also be examined in this manner.

Stains and Technics

Wright's or Giemsa's stain can be used. The material for examination is smeared on a slide in a thin smear. If watery ocular or nasal secretions are to be studied, it may be necessary to make thick smears by placing two or three drops in one spot on the slide. The secretions of each nostril or eye should be examined separately. After staining according to usual technics for blood smears, the slides are examined under the oil immersion objective.

Interpretation

Feces: Watery stools may be caused by parasites, allergic reactions, bacterial, viral, chemical or other agents. The first two are marked by a predominance of eosinophiles. In most parasitic infestations severe enough to produce diarrhea, the eggs will be sufficiently numerous to reveal the true cause. However, it is possible for immature, non-egg producing forms to produce marked diarrheas. While this possibility should be borne in mind, the finding of numerous eosinophiles in the absence of parasite eggs constitutes presumptive evidence of an allergic cause for diarrhea.

Bacterial and viral agents produce more neutrophiles and lymphocytes, whereas chemical agents may result in no leukocytic response or a predominently neutrophilic one.

As secondary infections develop in allergic or parasitic conditions, neutrophils will become numerous but eosinophiles will still be present in significant numbers.

Nasal and Ocular Secretions: In the early stages, the watery secretions of allergic conditions will contain primarily eosinophiles. However, if secondary infections become severe, the neutrophilic response may become predominant. Eosinophiles will still

be present in sufficient numbers to call attention to the possibility of an allergic reaction.

Skin Lesions: Allergic reactions are often suspected as the cause of skin lesions. Kral[1] indicates that certain foods, plants, external parasites (fleas, lice, ticks, mites) and various chemicals can cause this type of dermatitis. If allergic dermatitis is suspected, an impression smear can be made and examined for eosinophiles. The lesion must be in a moist condition for this examination. Allergic skin reactions often manifest themselves as dry wheals or papules, in which case histopathological examination of a biopsy will reveal the infiltrating eosinophiles to the pathologist.

Allergic and parasitic conditions are usually accompanied by an eosinophilia so that a differential leukocyte count on the blood will provide supportive evidence of the causative agents. Examination of the secretion or excretion will localize the affected area.

The depressing effect on eosinophiles of therapy by adrenocortical type preparations should be remembered in making examinations for these cells.

Smears from freshly obtained feces should be made promptly as delay results in degenerative changes and staining difficulties. The use of acid water in diluting Wright's and Giemsa stains accentuates the staining of the eosinophilic granules.

REFERENCE

1. Kral, F., Noninfectious Dermatoses in Dogs and Cats. *Veterinary Scope* (Upjohn Co.) 2(2):2-10, 1957.

Mule's Operation

Australian sheep breeders, because of conditions under which they operate, are still inclined to favor the J.H.W. Mule's operation for the prevention of the condition they designate as *blowfly strike*, an infestation of the skin area around the vulva.

As a contributing etiological factor, it must be noted that the tip of the vulva is usually directed to the right, or more frequently to the left, so that the last few drops of urine saturate the wool area of the vulvar region. Blowflies — in Australia, the *Lucilia sericata*, in America the *Lucilia cuprina* — deposit their eggs, and the larvae do extensive damage. The Mule operation consists of removing two elongated elliptical folds of skin on each side of the vulva. Sometimes the skin is removed only on one side, such as when the tip of the vulva is decidedly directed to one side. The excised fold usually extends from the level of the top of the vulva to at least 1 in. below the tip of the vulva. The lower part of the wound is tapered off; edges of the wound gap from ¼ to 1 in. The instrument used is the rolcut secateurs.

The operation is performed on females only at six to eight weeks of age, with the lamb in dorsal recumbency. American sheep breeders have not adopted Mule's operation. Smears and insecticides are seemingly preferred.— *R. R. Dykstra, D.V.M.*

for prophylaxis
or therapy in
most common
diseases of dogs...

GLOBULON™

is the most potent* purified fraction of canine antibodies

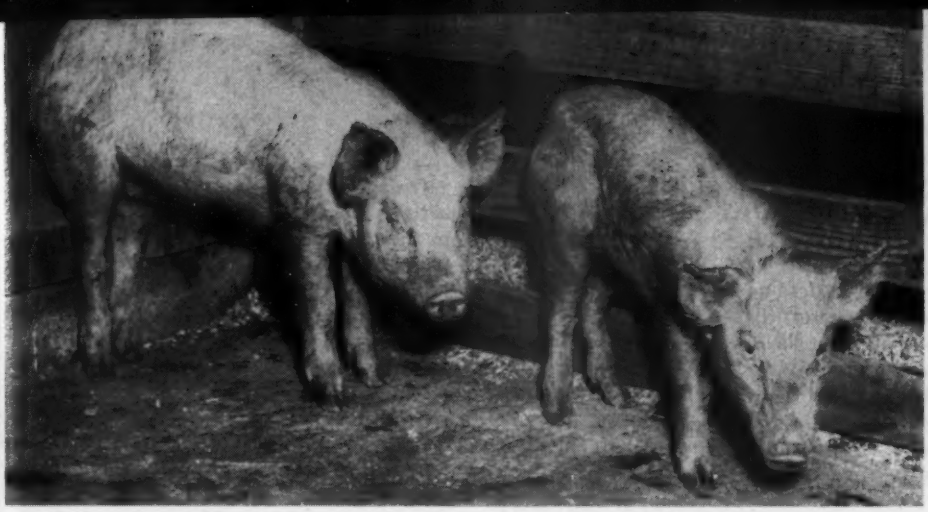
In the production of Globulon virtually all the immunologically inert serum proteins are eliminated leaving a purified fraction of antibody carrying globulins.

IN THERAPY, when maximum clinical response is imperative, Globulon lets you administer antibodies in amounts never before possible in the treatment of canine diseases.

FOR IMMEDIATE PASSIVE IMMUNITY to the common diseases of dogs, Globulon can be used in 1/5 the dosage needed with hyperimmune serum.

PITMAN-MOORE COMPANY
DIVISION OF ALLIED LABORATORIES, INC.
INDIANAPOLIS 6, INDIANA

*A single 20 cc. vial will protect three 65-pound dogs against distemper, hepatitis, and leptospirosis.



How Do You Handle Swine Respiratory Problems?

This VM interview with veterinarians in widely separated points throughout the hog belt reveals first hand facts on a timely seasonal problem.

John A. Bush, D.V.M.
Flora, Indiana practitioner

ARE YOU SEEING THE USUAL SEASONAL INCREASE IN SWINE RESPIRATORY PROBLEMS?

We have had quite a bit, off and on, all summer.

DO YOU SEE A SEASONAL PATTERN OF RESPIRATORY PROBLEMS IN THE LARGE FEEDING OPERATIONS?

We have quite a bit of flu and pneumonia all year long in these larger operations; however, we still have our seasonal increase.

DO YOU SEE TYPICAL INFLUENZA IN THESE LARGE OPERATIONS?

Yes, we do see influenza once in a while.

HOW DO YOU ATTEMPT TO CONTROL RESPIRATORY PROBLEMS IN LARGE SWINE OPERATIONS?

We look at it primarily from the standpoint of management. We try to improve ventilation wherever possible. We use some medication, primarily ammonium chloride or a guaiacol-type preparation. We use a lot of sulfathiazole in the water. It's still primarily a problem of management.

DO YOU HAVE MANY SHIPPED IN PIGS TO DEAL WITH IN YOUR AREA?

Yes, that's why we see trouble, off and on, all year. We have flu as a result of shipping.

DO THEY FEED HIGH LEVELS OF ANTIBIOTICS TO THESE SHIPPED IN FEEDER PIGS?

Some feeders do and others don't. I personally prefer that they don't. This expenditure makes some difference in the poorer quality pigs, but that's about it. On this type of pig we will feed mixed antibiotics at the 100 gm. level for the first week or two and gradually cut it out completely.

DO YOU FEEL THAT INFLUENZA IS A SERIOUS ECONOMIC PROBLEM?

In our good pigs flu hardly bothers them at all. Flu is a problem in the poorer quality pigs. Secondary pneumonia follows in three to four days.

DO YOU ATTEMPT INDIVIDUAL TREATMENT IN LARGE SWINE OPERATIONS?

We sort through large groups and try to see them at least once every two days when they first come in. A hospital pen is set up for treatment of the sick.

DO YOU PREFER USE OF SULFONAMIDES OVER ANTIBIOTICS?

Sulfathiazole is a standard treatment in shipped pigs. Our procedure is to use sulfathiazole in the water for the first three or four days after arrival. About the fourth day these pigs are wormed.

WHAT LEVEL OF SULFATHIAZOLE DO YOU USE IN DRINKING WATER?

We use a pound of U.S.P. sulfathiazole to 100 gallons of drinking water.

WHAT THERAPEUTIC MEASURES DO YOU USE AFTER WORMING?

On the fifth, sixth and seventh day after arrival these pigs go back on sulfathiazole in the drinking water. We also use quite a bit of inorganic iodide compounds such as Hyamine (Pitman-Moore). Iodide makes an excellent follow up therapy.

IS THIS PROCEDURE FOLLOWED ROUTINELY?

We have learned through several years of experience that it pays off to follow this procedure regularly. Many times it is the only medication shipped in pigs get.

Clark Collins, D.V.M.
Westpoint, Nebraska practitioner

DO YOU FIND SWINE RESPIRATORY PROBLEMS A BIG FACTOR IN YOUR SWINE PRACTICE?

Yes, we have found that sulfonamides in the drinking water are not sufficient to reduce the severe economic losses encountered in the 40 to 60 lb. pig. In the past, we have had too many of these animals with Virus Pig Pneumonia and snuffles become lungers and never recover.

DO YOU ALSO ENCOUNTER TYPICAL INFLUENZA?

Yes, but we seldom have a problem with gain losses if the condition is uncomplicated.

HOW DO YOU TREAT INFLUENZA?

We find that sulfathiazole in the drinking water is generally adequate if the condition is uncomplicated.

HOW DO YOU HANDLE THE PROBLEM HERDS WHICH YOU DESCRIBE AS HAVING VIRUS PIG PNEUMONIA AND SNUFFLES?

At the first sign of coughing, we prescribe

a special feed additive supplement we have developed, for three weeks. If signs of coughing appear again, this therapy of special antibiotic and nutritional support is started again. Results have been most gratifying, and we are currently summarizing results of several years experience which we believe will convincingly establish the merit of the veterinarian prescribing feed medication to fit the herd problem.

George Young, D.V.M.
Research-pioneer developer
Of pathogen free pig program,
University of Nebraska.

DO YOU FEEL THAT PATHOGEN FREE PIGS ARE MORE RESISTANT TO INFLUENZA?

No, I don't think there should be any difference. Just recently we completed work which for the first time confirms the theory of Shope that lungworms may carry the virus of influenza. We have been able to transfer the virus through the mechanism of the earthworm and the lungworm.

This means that if pathogen free pigs go on a farm where this situation exists, they still may be exposed to parasites and the virus. The only time that pathogen free status might help is when influenza might be transmitted by animals in the infectious state.

It is possible that many people confuse swine influenza with Virus Pig Pneumonia. A pathogen free pig program will knock that right in the teeth.

HOW DO PATHOGEN FREE PIGS RESPOND WHEN THEY RUN INTO AN INFECTIOUS DISEASE?

These pigs seem to be a little more resistant and handle infections easier. Our interpretation is that fewer secondary invaders are involved and, therefore, it is a milder infection.

Last fall we had one pathogen free herd which we thought had influenza although we could not isolate the virus. No pigs were lost, and they still weighed 198 lb. at five months.

DO YOU FEEL THAT WHEN INFLUENZA STRIKES THESE PIGS, IT CONSTITUTES NEARLY A PURE VIRUS INFECTION?

Yes, it is like Shope's filtrate disease. When we personally get upset, we quickly call it flu. Farmers and clinicians certainly do this with livestock, too.

Summary

Veterinarians interviewed voiced a nearly unanimous opinion that swine influenza, if uncomplicated, requires little therapy, but that Virus Pig Pneumonia and other chronic respiratory infections exact a terrific toll in lost weight gain and permanent stunting.

While therapeutic approaches vary, it is obvious that sulfathiazole still plays a major role in management of swine respiratory diseases. The application of specially prescribed feed additives by the veterinarian to meet special herd respiratory problems is a relatively new development.

Arthrocentesis of the Equine Carpus

R. W. VAN PELT, B.A., D.V.M.

The purpose of this paper is to promote a better understanding of the complexities surrounding arthrocentesis of the equine carpus. In recent years the development of adrenocortical steroids and their synthetic analogs for intra-articular use has made rapid strides. Conditions involving the carpus heretofore considered hopeless now show promise in the light of newer developments. To keep pace with the advances in equine medicine, we must also know how to use newly developed drugs properly or their value is lost. To insure that these new adrenocortical steroids designed for intra-articular injection are used to the best advantage, a thorough understanding of the complex carpal articulations and their synovial ramifications becomes necessary. To meet this end, gross dissections and contrast arthrograms employing a 50% solution of diatrizoate sodium (Hypaque—Winthrop) have been used.

Dr. Van Pelt is a Research Associate, Department of Surgery and Medicine, College of Veterinary Medicine, Michigan State University, East Lansing, Mich.

Published with the approval of the Director of the Michigan Agricultural Experiment Station as Journal Article No. 2678.

This work was supported by a grant from the Michigan Thoroughbred Foundation.

The author wishes to acknowledge clinical assistance by Dr. William F. Riley, technical assistance with radiographs by Dr. U. V. Mostosky, and photographs of gross dissections by Dr. L. R. Montgomery.

Intra-articular injection of adrenocortical steroids is recommended as an adjunct to general therapeutic measures to effect suppression of inflammation in peripheral arthritic joints.[6] In man it has been shown that the injected microcrystals of hydrocortisone disappeared from the synovial fluid quickly (within two hours) and were absorbed and retained by the lining cells of the synovial membrane.[1] By acting directly on the synovial membrane and indirectly reflecting this action by a return to normal of the synovial fluid, intra-articular use of the adrenocortical steroids therefore becomes a valuable addition to the armamentarium of the equine practitioner.

Arthrocentesis serves not only as a means of relieving increased intra-articular pressure but also as an avenue by which therapeutic agents may be introduced to the joint cavity.

Arthrocentesis and injection of the carpus is indicated in cases of acute or chronic arthritis, acute or chronic synovitis, and septic arthritis either as a result of systemic invasion of the joint or due directly to penetrating wounds.

Proper technic therefore becomes a must to insure adequate aspiration of synovial fluid from the carpal articulations and at the same time avoid further injury to the structures of an already inflamed joint.

Figure 1. A lateromedial contrast arthrogram of the right radio-carpal synovial sac (A) and its volarlateral pouch (B). Note the extensive ramifications of the volarlateral pouch in this example. The volarlateral pouch (B) has been outlined for purposes of clarity in reproduction.

Figure 2. An anteroposterior view of the carpus as shown in Fig. 1. Visualize again the relationship between the radio-carpal synovial sac (A) and its volarlateral pouch (B).

Anatomical Considerations

The equine carpus is a complex diarthrodial articulation composed of three chief joints, viz., (1) radio-carpal, (2) intercarpal, and (3) carpo-metacarpal.[5] The first two joints are ginglymus in nature, while the latter is arthrodial. The carpus is situated strategically in the middle of the limb, where its short bones are a potent factor in shock absorption. They accept and dissipate the concussion that is generated when the limb strikes the ground.[4] Hence, the complex disorders that arise due to carpal arthritis.

The fibrous layer of the joint capsule is common to all three articulations, while its synovial lining is arranged to form three sacs, one to each of the three articulations.

The radio-carpal synovial membrane surrounds the distal end of the radius and proximal row of carpal bones (Figs. 1 & 2), ascending between these bones as far as their interosseous ligaments. This sac does not communicate with the intercarpal articulation. The intercarpal synovial membrane encloses the articulation that comprises the proximal and distal row of carpal bones and communicates with the carpo-metacarpal articulation between the second and third carpal bones (Fig. 3).[2] The carpo-metacarpal synovial membrane then encompasses the articulation between the distal row of carpal bones and the proximal ends of the metacarpal bones. It will be noted (Fig. 3) that the membrane descends between the joints formed by the heads of the second and fourth metacarpals with the third metacarpal. In cases of high splints involving the carpo-metacarpal articulation, this anatomical feature is well worth noting.

The volarlateral pouch (Fig. 1) of the radio-carpal synovial membrane can be located in the groove between the posterior surface of the radius and the anterior surface of the accessory carpal bone.[3] Acute inflammations of the radio-carpal articula-

Figure 3. An anteroposterior contrast arthrogram of the right intercarpal (A) and carpometacarpal synovial sacs (B). Contrast media has been injected in the intercarpal articulation to demonstrate its communication with the carpo-metacarpal articulation between the 2nd and 3rd carpal bones (arrow follows path of communication between the two articulations). Note also the descent of the carpo-metacarpal synovial sac between the heads of the 2nd and 4th metacarpals at their point of articulation with the 3rd metacarpal.

Figure 4. Lateromedial arthrogram of a normal equine carpus in the flexed position. Note how the radio-carpal (A) and intercarpal (B) articulations open up to make their cavities readily accessible. The carpo-metacarpal articulation (C) is arthrodial in nature and therefore is not accessible.

tion will cause a perceptible distention of this pouch. This anatomical feature may be a factor in production of secondary tenosynovitis of the superficial and deep digital flexors as they pass through the carpal canal.

It is probable that some of the reasons for poor results obtained by intra-articular injection of adrenocortical steroids or failure to relieve intra-articular pressure are due in part to an improper knowledge of the respective articulations and their synovial sacs that make up the carpus.

Technic

The preferred approach for arthrocentesis of the carpus, either the radio-carpal or intercarpal articulation, is from the anteromedial aspect of the flexed carpus. Closely clip the area and scrub with a good surgical soap to remove dirt, hair clippings, sebaceous debris and dead skin. Next carefully dry the area and cleanse with 70% ethyl alcohol. A small amount (1 to 2 cc. per site) of 2% lidocaine hydrochloride (Xylocaine—Astra) with 1:100,000 epinephrine introduced subcutaneously will reduce to a minimum, pain or irritation to the patient during arthrocentesis and injection of the respective carpal articulations. While waiting for the anesthetic to exert its effect, paint the site with either Iodine Tincture, U.S.P. or Strong Iodine Tincture, N. F. By the time this dries, anesthesia will have produced its maximum effect and the next procedure may be taken.

Arthrocentesis of the radio-carpal articulation is best performed with the limb flexed at the carpus, thus opening the articulation. This procedure allows for easy access to the joint cavity (Fig. 4) as noted by the space formed between the anterior portion of the distal end of the radius and the proximal row of carpal bones. In this position, care is taken to avoid the tendon of the *extensor carpi radialis* as it passes over the anterior surface of the carpus and the tendon of the *extensor carpi obliquus* passing over the aforementioned tendon (Figs. 5 & 6) to attach on the head of the medial metacarpal bone. Needle penetration of these tendons and their associated sheaths would only result in undue irritation to the patient, as well as the possibility of breaking a needle, should the patient extend the limb.

The site for puncture is readily palpated at the anteromedial aspect of the radio-carpal articulation (Fig. 5). An 18-gauge, one-inch needle is suitable for aspiration and/or injection. Direct the needle directly inward in an anteroposterior relation to the carpus. Care is exercised to avoid nicking the articular surfaces of the radius or carpal bones.

The flexed position tenses the fibrous joint capsule and makes for easier entry. Once the synovial membrane is punctured, the needle may be left in position or rotated in an oblique to transverse direction, with the bevel facing inward. This latter position reduces the possibility of impingement should the patient suddenly extend the limb. When entry into the joint is made, there is a faint "sucking" sound due to the slightly negative intra-articular pressure. This may not be noted in cases of increased intra-articular pressure due to increased amounts of synovial fluid.

A sterile syringe is next attached for

Figure 5. In this gross dissection of the right carpus, the tendons of the extensor carpi radialis (A), extensor carpi obliques (B) and common digital extensor (C) have been isolated to show their relationship on the anterior surface of the carpus. A needle has been inserted in the radio-carpal joint cavity in order to show its relationship to the aforementioned tendons.

Figure 6. This is the same specimen as shown in Fig. 5, with the exception that the needle has been inserted in the intercarpal joint cavity in order to show its relationship to the tendons passing over the anterior surface of the carpus.

aspiration of the synovial fluid. Care should be exercised not to withdraw the plunger of the syringe too rapidly or too forcibly, since a small villous portion of the synovial membrane may be drawn into the needle, resulting in withdrawal of minimal amounts of synovial fluid. The amount aspirated will depend on the quantity of the drug planned to be introduced and the quantity in excess of normal that is desirable to remove in order to reduce increased intra-articular pressure.

Generally speaking, the amount of synovial fluid removed is equal to the quantity of material to be injected. However, in a long-standing chronic arthritis with reduced synovial fluid, this may not be possible and in order to meet therapy requirements, the desired dosage is introduced. Some patients will exhibit temporary discomfort due to increased intra-articular pressure, but this usually relieves itself within 12 to 24 hours.

In patients that exhibit gross distention of the fibrous joint capsule, arthrocentesis may be performed with the limb extended (standing position). Point of entry is the same site as for routine puncture. Arthrocentesis may also be performed at the volarlateral pouch of the radio-carpal articulation in cases of gross distention. The same aseptic pre-injection precautions apply here also.

Arthrocentesis of the intercarpal articulation is performed in the same manner as described for the radio-carpal articulation. The site of puncture is palpable at the anteromedial aspect of the intercarpal articulation (Fig. 6), with the carpus in the flexed position. Remember that this articulation communicates with the carpo-metacarpal joint cavity and as a rule slightly more synovial fluid can be aspirated. If therapy is directed at both the intercarpal and carpo-metacarpal joints, then slightly more synovial fluid is withdrawn as correspondingly greater amounts of adrenocortical steroids are introduced.

Because the carpo-metacarpal articulation is arthrodial in nature, arthrocentesis of this joint cavity is not conducted.

Following withdrawal of the needle, some patients will exhibit external hemorrhage at the site of puncture. This is usually more apparent in fine-skinned breeds and patients with acutely inflamed knees. In order to minimize hemorrhage, the needle openings are closed with either a large (22 mm.) or medium (15 mm.) size Michel clip. Some patients will also react to the local anesthetic as evidenced by swelling and inflammation. In these cases, use of a figure-eight bandage over the anterior surface of the knee will reduce to a minimum this reaction. Antiphlogistic preparations may be used in addition to facilitate the effects of bandaging. Bandages are removed daily and reapplied until swelling subsides.

Summary

The value of arthrocentesis and injection of intra-articular adrenocortical steroids has been discussed in the light of anti-inflammatory action at the joint level.

Contrast arthrograms employing a 50% solution of diatrizoate sodium have been used to demonstrate the confines and ramifications of the carpal articulations. This serves as a means whereby one can visualize the structures that come in contact with intra-articular adrenocortical steroids.

A technic for arthrocentesis and injection of the radio-carpal and intercarpal articulations has been described. Since the carpometacarpal articulation communicates with the intercarpal articulation, arthrocentesis and injection of this joint was not discussed.

REFERENCES

1. Hollander, J. L., Intra-Articular Hydrocortisone Treatment of Arthritis. *Annals of Internal Medicine*, 39:735-746, 1953.

2. Hughes, H. V. and Dransfield, J. W., McFadyean's Osteology and Arthrology of the Domesticated Animals. 4th ed. Bailliere, Tindal and Cox, London, England, 248-252, 1953.

3. Rooney, James R., Guide to the Dissection of the Horse. Edwards Brothers, Inc., Ann Arbor, Mich., 114-116, 1951.

4. Taylor, John A., Regional and Applied Anatomy of the Domestic Animals, Part Two, Thoracic Limb. J. B. Lippencott Co., Philadelphia, Pa., 117, 1959.

5. Sisson, Septimus and Grossman, J. D., The Anatomy of the Domestic Animals. 3rd ed. W. B. Saunders Co., Philadelphia, Pa., 223-224, 1950.

6. Van Pelt, R. W., The Role of Intra-Articular Adrenocortical Steroids. *M. S. U. Vet.*, 20:68-78, 1960.

SMALL ANIMAL PRACTICE

NOW, AN ANTIBACTERIAL
WITH DISTINCTIVE BENEFITS
IN VETERINARY MEDICINE

bactrovet*

(Brand of Sulfadimethoxine)

...COMBATS BOTH GRAM-POSITIVE AND GRAM-NEGATIVE BACTERIA

IS EXCEPTIONALLY SAFE THERAPY

IS AN IDEAL AGENT FOR DISPENSING

IS CLINICALLY EFFECTIVE IN ONCE-A-DAY DOSAGE FOR

pneumonia	otitis	prostatitis	cellulitis
enteritis	bronchitis	mastitis	abscesses
pharyngitis	cystitis	metritis	wound infections

PITMAN-MOORE COMPANY DIV. OF ALLIED LABORATORIES, INC., INDIANAPOLIS 6, IND.

Ask your Pitman-Moore Company representative for clinical literature or write the Professional Service Department

*Pitman-Moore Company's trademark for 2,4-dimethoxy-6-sulfanilamido-1,3-diazine

Pyloric Stenosis in a Puppy

GEORGE E. HAHN, D.V.M.
Jeffersonville, New York

The case in question concerns a three month old male beagle puppy. The puppy was sold as a pet, and although there was no drastic change in diet, within a few days it started to vomit 20 to 30 minutes after each feeding. Solids were taken in progressively smaller amounts so that by the end of two weeks no solids would be accepted. Fluids were kept down if taken in small amounts, but they too were refused by the end of two weeks. Bowel movements were normal at first, but during the two week period they decreased in quantity and stopped.

During this period of time the puppy was kept alive with intermittent care at another clinic by the use of fluid and vitamin therapy, antispasmodics, and a variety of fluid and solid foods given by mouth. At this time radiographs, taken several hours after barium contrast media had been administered, showed an enlarged stomach and small amounts of the media present in the small intestine.

Upon admission into the clinic the patient was markedly dehydrated. The pulse, respiration and temperature were normal. There was weakness to the point of not being able to stand, but the mucous membranes showed good color for the cachectic condition of the animal. At this time, a variety of foods and water were offered, and although the patient showed definite interest, it refused everything. From the above symptoms and clinical examination a diagnosis of pyloric stenosis was made and it was decided to correct the condition surgically.

Preanesthesia consisted of morphine sulfate ¼ gr. and atropine sulfate 1/150 gr. given intramuscularly. Surgical anesthesia was accomplished with pentobarbital sodium given intravenously to affect. The patient was restrained in dorsal recumbency, the abdomen clipped for a midline incision, washed with soap and water, defatted with ether, and painted with phenyl mercuric nitrate.

The abdomen was incised from a point three-quarters of an inch posterior to the umbilicus forward for a distance of two inches, and the abdominal viscera were exposed. The pyloric end of the stomach was located and withdrawn from the abdominal cavity. A markedly constricted pyloris was observed. The stomach was enlarged, being filled with gas and fluid. No fluid could be squeezed from the stomach into the

duodenum. The stricture in the pyloris was corrected by the Fredet-Ramstedt[1] procedure in which the serosa and muscular coats are incised down to but not through the mucosa from a point one-quarter of an inch on the duodenum, through the pyloric sphincter, to a point one-quarter of an inch on the stomach. When pressure was applied to the stomach, gas and fluid could be forced into the duodenum. The remaining abdominal viscera appeared normal. Closure of the abdominal cavity was accomplished using separate layers of interrupted sutures of 0 medium chromic catgut in the peritoneum, muscle, and skin. Four hundred thousand units of procaine penicillin, and 0.5 gm. dihydrostreptomycin were given at the completion of surgery.

Aftercare: Twelve hours post-surgically, three tablespoons of horse-meat broth was offered and taken. It was repeated 12 hours later. No vomiting occurred and after the second feeding the patient made some attempts to play and wag his tail.

Second post-operative day—C/D meat broth was given in one ounce amounts four times during the day. In addition, two ounce feedings of milk were given twice at eight hour intervals. No vomiting was observed at this or any other time that the patient was hospitalized.

Third post-operative day—Broth was fed as on the day before with additional feedings of milk. In addition, one 25 mg. tablet of Jenotone was administered one-half hour before the morning and evening feedings. This consisted of one tablespoonful of C/D and it was accepted.

Fourth post-operative day—Milk was fed in three unlimited feedings. Two doses of Jenotone were administered as on the previous day. He ate two ounces of C/D at each of three feedings.

Fifth to eleventh post-operative day—Patient was fed milk, C/D, and P/D. No medications were given. The patient was alert, lively and hungry.

Twelfth post-operative day—The patient was discharged. He had gained more than two pounds. The skin incision had opened over the middle one-half of its length but second intention healing was progressing.

Summary

1. A case of pyloric stenosis was corrected surgically with encouraging results. This case was unlike the congenital hypertrophic pyloric stenosis found in infants; but the time of onset of symptoms, the symptoms of the patient and the progressive debility of the patient were similar to those seen in infants with congenital hypertrophic pyloric stenosis.

2. The surgical site was chosen to give free access to all the abdominal viscera so that a complete exploratory operation could be accomplished in addition to the necessary corrective surgery.

3. C/D was utilized in the initial stages of recovery because of its high palatability for young puppies.

4. The procedure performed is no more time consuming and much easier to do than a common six month puppy spay.

REFERENCE

1. Lewis' Practice of Surgery, Volume VI, Chapter seven. W. F. Prior Company, Inc. Hagerstown, Maryland.

A Practical Technic for the Relief of Egg Bound Birds

CHARLES P. GANDAL, D.V.M.
Veterinarian, N. Y. Zoological Park

The increased popularity of parakeets and other avian pets has resulted in many more practitioners being called upon to treat birds. One of the problems they have to contend with is the "egg bound" syndrome.

The diagnosis of "egg bound" should always be carefully arrived at, especially by those not familiar with birds. One should check the bird's history carefully and try to ascertain whether the bird is definitely a female, then gently palpate the lower abdomen, keeping in mind the general size and shape of an egg and the fact that retained eggs usually are lodged in the distal portion of the oviduct. It is quite easy to distinguish between the gizzard and an egg, and the main problem in differential diagnosis will involve neoplasms of the kidneys or reproductive tract. These tumors are rarely as smooth sided as an egg and are usually located much deeper within the abdominal cavity.

Having established a diagnosis, treatment should be instituted as soon as possible. Many birds have been treated at home with mineral oil, steaming, etc., according to accepted traditions.[1,2,3,4,5,6] That these methods will work in some cases cannot be doubted but often no relief is obtained and when the bird is presented for treatment she is likely to be quite weakened both from the primary condition and the handling occasioned by home treatment. In the past, those cases that did not respond to lubrication and heat were treated by rupture of the shell with subsequent attempts to remove the broken shell fragments and liquid contents. This was frequently unsatisfactory, especially since the birds were rarely anesthetized and as they were already under severe stress, further handling and manipulation placed an additional burden upon their system. Some of the birds treated in this manner went into shock and died, while others became sterile.

In the New York Zoological Park we have few egg bound patients but attention was focused on the possibility of a new approach to this problem while we were engaged in preliminary trials of an avian anesthetic. During these trials four domestic hens layed eggs while under general anesthesia. These eggs were layed 12 to 35 minutes following induction of light to medium surgical anesthesia.

Several months following these trials an egg bound White Pekin Duck was presented for treatment. The duck was anesthetized with Equithesin[7] (Jensen-Salsbery) and using the technic herein described, the egg was delivered intact. Since that time eight parakeets, two ducks and one canary have had their egg bound condition successfully treated using this method.

Procedure

Following diagnosis the birds are anesthetized using Equithesin at the rate of 0.20 to 0.22 cc. per 100 gm. given deep in the breast muscle. This is sufficient to produce light anesthesia for the brief period of time needed to remove the egg. After induction of anesthesia the area about the vent is cleaned and a thin layer of vaseline is applied to adjacent feathers to keep them clear of the field.

For parakeets, canaries and smaller birds a serrated-tip thumb forceps is inserted into the cloaca in closed position and then allowed to slowly expand, thereby dilating the cloaca and visualizing the entrance to the oviduct (an adjustable human nasal speculum may be used for chickens, ducks and larger birds). *(Continued on page 65)*

Part 1

A Review of Diseases Of Some Exotic Animals

This is the first part of a reference review covering some costly diseases of fur-bearing animals and some major diseases of primates.

S. F. SCHEIDY, V.M.D.* and
MARGARET R. MULROONEY, A.B.*

Introduction

Neither the diseases nor the animals which are to be discussed are exotic in the usual sense of the word. However, since the average veterinarian is not apt to be called upon to treat a duckbilled platypus or a three-toed sloth, it seems more pertinent to discuss foreign species of animals that he may be called upon to treat occasionally, and especially animals of economic importance. Consequently, we should like to discuss the more common and costly diseases of some fur-bearing animals and some of the major diseases of primates.

Chinchilla

The chinchilla was introduced into the United States for other than show purposes in the 1920's by an enterprising businessman returning from a business trip to the Andes Mountains of South America.[1] The natural habitat of this animal is at high altitudes, but it has adapted itself quite well to conditions prevailing in captivity at much lower altitudes.

Several reports of autopsies of chinchillas[2,3,4] indicate that the leading causes of death have been gastrointestinal disorders and respiratory infections. The former may be caused by a number of bacterial, parasitic and probably viral organisms. These infections frequently cause large losses and may be difficult to control.[5] Among the bacteria incriminated in various outbreaks have been species of salmonella, pseudomonas, listeria, pasteurella, porteus, and staphylococcus.[1,5-9,13] Important parasites causing intestinal disorders are giardia and trichomonas species.[1,5-8,10] Viruses have not been isolated, as far as can be determined, but they may well be implicated, alone or in addition to other factors, in non-specific enteritis.

Gastrointestinal Disorders

In several reports an unfortunate characteristic of many intestinal disorders of chinchillas is that they often are of low morbidity but high mortality.[3,9] Quite frequently animals are found dead without any previous symptoms of illness; the problem then becomes one of finding the causative organism so that spread of the disease to healthy members of the herd can be prevented or minimized. Changes in the consistency of the stool, with or without listlessness or inappetence, should prompt laboratory study to determine, if possible, the etiology of the disease. General measures

*Research & Development Division, Smith Kline & French Laboratories, Philadelphia, Pennsylvania.

which have been found effective in treating diarrhea are correction of unhygienic living conditions, dietary changes, the administration of pablum, the prepared baby food, at the first sign of looseness[6] and the administration of a kaolin and pectin mixture.[7] Feed and water containers should be cleaned and sterilized daily, and sick animals should be isolated and quarantined.[5,10] Koch[10] recommends reducing the pellet ration to one-quarter and feeding as much good clean hay as the animal will eat, then increasing the pellet ration gradually as the disease wanes. Lindsey,[12] on the other hand, recommends removing all hay and pellets and feeding a diet of greens only.

Treatment of enteric infections depends, of course, on the etiologic agent. The only type of enteritis which prompts general agreement on the therapy of choice is that due to giardiasis. Here, quinacrine hydrochloride has been found effective.[1,5-8] Several dosage regimens have been recommended, including one which suggests preparing a suspension of quinacrine hydrochloride in water in such a way as to provide 6-9 mg./animal/day and spraying this on the feed pellets for 5-7 days.[1,7] Another regimen combines quinacrine hydrochloride and diiodohydroxyquin, mixing 975 mg. of each in 100 ml. water and spraying the mixture onto the feed pellets.[5,8] About 0.5 ml/animal/day should be ingested. This treatment may be continued for two weeks.

Koch,[10] who claims that enteric infections are more often than not due to proteus or pseudomonas organisms, suggests treatment on a herd basis with a sulfonamide preparation added to the drinking water for a period of three days and repeated in three days if necessary. On the other hand, sulfonamides have been reported to be toxic for chinchillas, and it has been urged that their use be restricted to cases in which no other medication can control the specific infection.[6] Another study reports that most enteritides will respond to streptomycin therapy but that this antibiotic should be used with great caution because of its possible toxicity to chinchillas.[6] Still another report suggests the use of broad spectrum antibiotics, such as oxytetracycline (10 mg./day in divided doses for four days), or sulfonamides.[6]

In summary, enteritis of known etiology is probably best treated by the discriminating use of the sulfonamide or antibiotic to which the organism proves most susceptible. If the etiology cannot be determined, the general measures mentioned above should be employed. Antibacterial compounds should be used with caution: Chinchillas do not tolerate them well, and these drugs destroy not only the pathogenic, but also the normal flora of the intestinal tract.

At the opposite end of the spectrum from the intestinal disorders characterized by diarrhea is impaction, another bugaboo of the chinchilla breeder. This disorder has been attributed variously to improper diet (that is, insufficient green foliage), poor management practices, environmental influences such as heat and cold, and the excessive administration of antibiotics.[1,9,7,10] Symptoms are scanty, dry, and sometimes misshapen feces. The animal may lie down and stretch as though in pain. The impaction can often be felt through the body wall as a doughy mass. Treatment consists of equal parts of milk of magnesia and mineral oil administered in divided doses to the extent of about 5 ml./day; 5 ml. of 5 per cent dextrose in saline may be given subcutaneously to correct dehydration.[1,5,7,11,10] In problem herds, removing inferior hay and pellets from the diet and substituting only alfalfa of the best quality may be helpful.[7,10] The feeding of two or three raisins a day has been suggested as a preventive measure.[1]

Respiratory Diseases

Respiratory disease in chinchillas have been attributed to a number of bacteria operating singly or in combination. Beginning symptoms are wet nose and eyes and general listlessness.[1] Antibiotics, chiefly penicillin, and sulfonamides are recommended for treatment,[1,9,11,10] with oxygen as supportive therapy. It is advisable to check the humidity and temperature of the animals'

quarters when there is an outbreak; the temperature should be kept below 80° F. and the humidity should be low.[11]

Dermatological and Other Problems

Dermatological diseases constitute another problem of considerable economic importance. Chief among the disorders affecting pelts is fur chewing. In spite of numerous studies to determine the etiology of this habit, no satisfactory explanation has yet been presented. At one time or another, investigations have incriminated dietary deficiencies, endocrine abnormalities, intestinal infections, faulty housing and genetic factors.[6,19] No one of these, however, has proved to be of general etiologic significance. The same bad luck has attended efforts to prevent fur chewing by means of various medications — female hormones, thyroid antagonists, tranquilizers and selenium compounds.[19] Thus, the solution to the problem of preventing and treating this disorder lies in the future. In the meantime, the veterinarian can recommend some general precautions which may curb this distressing syndrome: avoidance of stressful conditions, maintenance of low humidity and ample ventilation in animal quarters, constant observation of the herd for dietary adequacy and general good health, and avoidance of sudden and radical changes in herd management practices.[19]

Fungus infections create another dermatologic problem of economic significance. Although these are reported not to be common occurrences,[6] they are indeed distressing to the rancher. Trichophyton species are usually the causative organisms in these dermatoses.[1,7] Lesions usually appear first about the nose and anus and may spread over the entire body, causing hair loss, reddening of the underlying skin and a scaly desquamation.[7] Diagnosis may be made by gross examination, the use of Wood's light and direct microscopic examination of hair removed from the affected area.[7] Most of the common fungicides have been used with varying degrees of success —mercresin, merthiolate, iodine, Soprono Solution, Desenex Powder or solution and most recently griseofulvin.[1,6,7,20,21] Suggested dose of griseofulvin is 20-30 mg./kg./day.

Dental problems are not infrequently seen in chinchillas. Malocclusion can make eating so difficult that the animal will reject feed and eventually starve to death.[5,6,7] In affected animals, examination will reveal that the incisors are too long for complete closure. Treatment consists in cutting them off to a length that enables the animal to close its mouth. Molars may also be affected: they may develop spurs, which make chewing and sometimes even movement of the tongue difficult. Spurs on the molars can usually be detected by moving the lower jaw back and forth against the upper jaw; a grinding or catching of the teeth establishes the diagnosis. Animals with a severe degree of malocclusion are generally not worth saving, but an attempt to snip off spurs may be made with a pair of long, narrow, two-inch needle-nose pliers.[7]

The question of prophylactic feeding of antibiotics to chinchillas has been debated. Brenon[22] claims that feed supplemented with chlortetracycline has markedly decreased disease incidence, accelerated the growth rate and had no adverse effect on fertility.

Farrell,[23] on the other hand, found circumstantial evidence that feeding a tetracycline antibiotic led to an overgrowth of *Pseudomonas aeruginosa* which became so virulent that it killed affected animals within 12-24 hours. It appears that more controlled studies are necessary before the value or danger of routine antibiotic supplementation of the feed can be definitely established.

In conclusion, it should be stressed that no medication will substitute for hygienic management practices in maintaining good health in a chinchilla herd. Ranchers should be advised especially to shield their herds from wild rodents, since many diseases of chinchillas are acquired through this contact, and to quarantine new breeding stock for a period after acquisition and observe them closely for signs of disease.

Diagnostic Notes . . . "Quotes"

English Flea Comb

Improves Examination Skills

I am submitting this report on a simple inexpensive instrument because many veterinarians, especially recent graduates, do not realize that such a handy gadget is available. If these instruments operated by some electronic device and cost enough so that there was a lucrative profit in the sale, every instrument salesman and supplier would be expounding their merits.

The diagnosis of fleas on the dog and cat is made quickly and easily by the use of the English Flea Comb. These combs were available in this country before World War II but were not available during and after the War. The combs are available again and may be purchased from pet supply houses. We have purchased them from Warner Products, Baldwinsville, N. Y. for $1.00 each.

The use of the comb as a diagnostic instrument in the examination room impresses the client that a thorough examination is being made. Frequently, a stray flea is trapped in the comb after a few strokes on an animal which the owner has spent hours searching hair by hair. In our practice the flea is the principal cause of scratching dogs and associated allergic and traumatic dermatitis.

The use of the comb facilitates any examination of the skin. We also find it useful for removing small encrustations of dried blood at the site of a minor wound before discharging the patient.

Diagnosis and control of external parasites in the small animal practice and hospital is very important public relations. Our paid public relations men cannot help explain why Fido had fleas when he came home from the hospital, when the owner, Mrs. Jones, was sure that he didn't have any when she left him. We all know that Fido had the fleas and there were fleas at home, but Mrs. Jones doesn't know it unless we tell her that we found fleas on Fido when he came to the hospital.

R. GEORGE WISWALL, D.V.M.
Glens Falls, New York

Heart Monitor

For Surgery

HOLD STILL — for a heartbeat! This puppy listens to a strange "beeping" sound from the small instrument in foreground, a new electronic heart monitor supplied to veterinarians by the NCG Division of Chemetron Corporation. The device "tells" doctors the electric-wave activity of the heart when connected to an animal or person. It is most useful during surgery.

announcing a welcome event...

NAME:

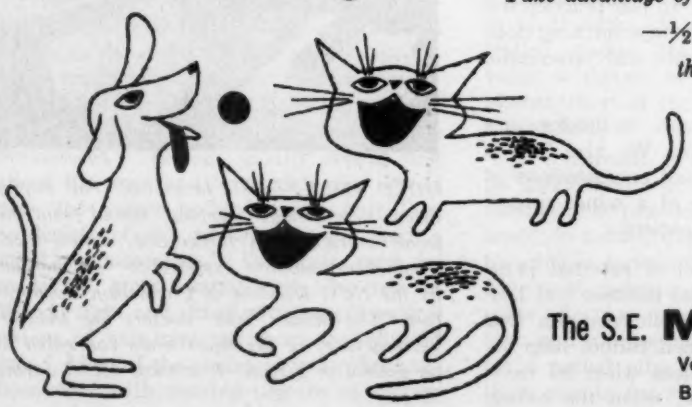
pet-tabs, jr.

PARENTS: pet-tabs

WEIGHT: Just right for cats and toy breed dogs

Young Pet-Tabs, Jr. is the spittin' image of Pet-Tabs—same popular combination of 19 essential vitamins and minerals—only Pet-Tabs, Jr. is smaller, just the right size for cats and toy breed dogs. One tablet a day gives complete nutritional support. They're easy to administer because cats and dogs relish the tasty meat flavor (even storks like them).

Take advantage of our introductory offer —½ dozen bottles free with the purchase of 3 dozen.



The S.E. Massengill Company
Veterinary Division
Bristol, Tennessee

Cerebral Angiography in the Dog

CHARLES W. JAMES, DVM and
B. F. HOERLEIN, DVM, PhD

A technic has been developed from experimental studies with cerebral angiography in the dog whereby adequate radiographic visualization of the arterial supply to the brain can be obtained. This procedure has been shown to be clinically safe and relatively simple. This paper will describe the technic developed as a result of 26 angiographic series (53 injections) conducted on 22 experimental animals using Hypaque®* and Hypaque®-M* as contrast mediums. In addition the use of Hypaque-M on six clinical cases will be described.

Literature Cited

The first diagnostic cerebral angiogram was made in 1928[1] by Egas Moniz using sodium iodide as a contrast medium. Moniz had previously tested several compounds for toxicity and contrast in the dog in an attempt to find a substance that would afford good radiographic contrast with a minimum of toxicity. Since that time the technics and contrast mediums have been improved to the extent that cerebral angiography is widely used as an aid to the diagnosis of intracranial pathology in man,[1,2,3,4] but no work has been published concerning the diagnostic application of cerebral angiography to the dog.

Cerebral angiography was performed in the dog by Whiteleather and DeSaussure,[5] but their studies were designed primarily for testing the toxicity and contrast of Hypaque. They found Hypaque to be relatively nontoxic and their report contained other information very valuable in developing the technic.

DeLaToore,[6] *et al.*, conducted angiographic studies and correlated them to dissection findings in order to further the knowledge of the anatomy of the cerebral circulation of the dog. Since their work was not published at the time these experiments were conducted, it was not beneficial in the development of this technic. Himwich,[7] *et al.*, used angiography in dogs to study blood flow patterns in the cerebral circulation following ligations of certain arteries. These experiments were conducted so that the effects of certain drugs could be studied in restricted areas of the brain.

Anatomy

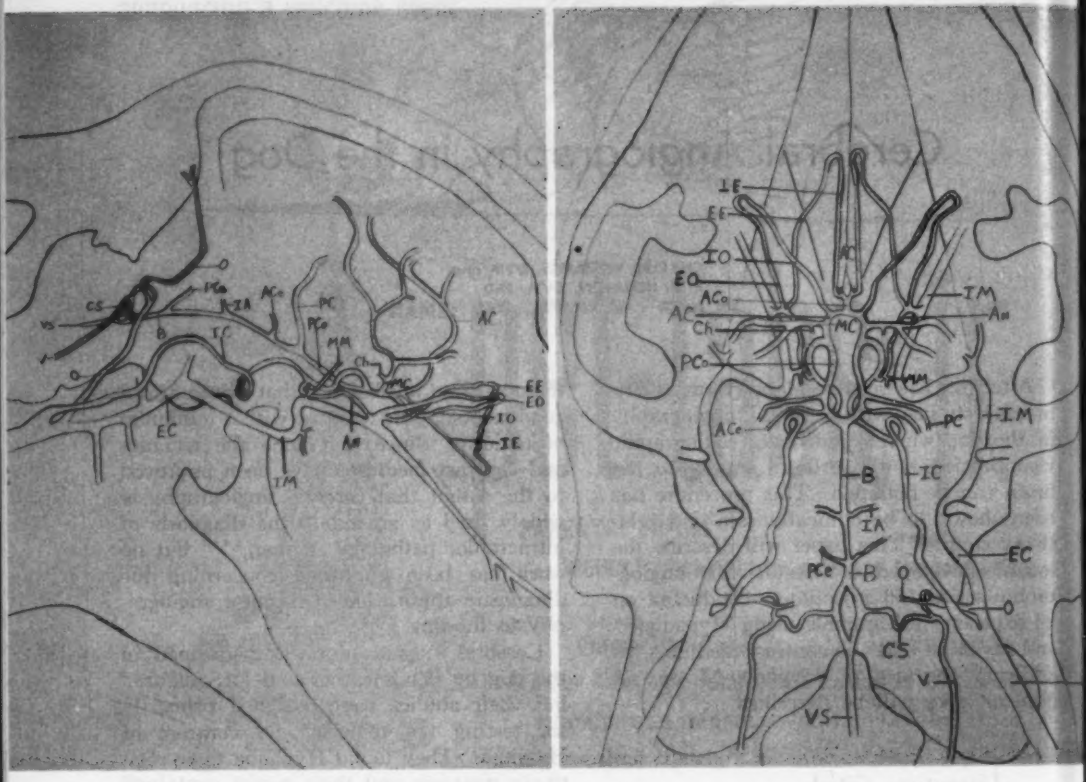
The brain of the dog receives blood from two principal sources: the two internal

*Hypaque® is a 50% aqueous solution of diatrizoate sodium.

*Hypaque®-M is a 90% aqueous solution containing 30% (W/V) diatrizoate sodium and 60% (W/V) of the N-methylglucamine salt of diatrizoic acid.

These products are manufactured by Winthrop Laboratories.

From the Department of Anatomy and Histology (James) and the Department of Small Animal Medicine and Surgery (Hoerlein), School of Veterinary Medicine, Auburn University, Auburn, Alabama.
Materials for this study were furnished in part by the Scott Research Grant, Auburn Research Foundation, Auburn, Alabama.
Approved by the Committee on publications as paper No. 869.



Figs. 1 and 2—Diagrams showing the arterial supply to the brain. (Lateral and dorso-ventral views). Key to abbreviations:

An —Anastomotic artery.
AC —Anterior Cerebral artery.
ACe—Anterior Cerebellar artery.
ACo—Anterior Communicating artery.
B —Basilar artery.
CC —Common Carotid artery.
Ch —Choroid artery.
CS —Cerebrospinal artery.
EC —External Carotid artery.
EE —External Ethmoidal artery.
EO —External Ophthalmic artery.
IA —Internal Auditory artery.
IC —Internal Carotid artery.
IE —Internal Ethmoidal artery.
IM —Internal Maxillary artery.
MC —Middle Cerebral artery.
MM—Middle Meningeal artery.
O —Occipital artery.
PC —Posterior Cerebral artery.
PCe—Posterior Cerebellar artery.
PCo—Posterior Communicating artery.
V —Vertebral artery.
VS —Ventral Spinal artery.

carotid and the unpaired basilar arteries (Figs. 1 and 2).[6,8,9,10] The internal carotid artery is one of the terminal branches of the common carotid, while the basilar is formed by the two cerebrospinal arteries. The internal carotid artery enters the cranium through the petrobasilar fissure and courses through the carotid canal. It usually leaves the cranium by forming a loop in, or ventral to, the carotid foramen, then re-enters the cranium through this foramen. The artery passes through the cavernous sinus and subsequently divides into an anterior and posterior branch. The anterior branch passes forward and divides into the middle and anterior cerebral arteries. The middle cerebral gives origin to the choroid artery. The anterior cerebral

gives off the internal ophthalmic and internal ethmoidal arteries. Between the origins of the latter two vessels the anterior cerebral artery receives the anterior communicating artery which connects the right and left anterior cerebral arteries. The posterior branch of the internal carotid (posterior communicating artery) anastomoses on each side with the terminal branches of the basilar artery forming the posterior cerebral arteries.

The basilar artery is formed by the cerebral branches of the cerebrospinal arteries. These cerebrospinal arteries are formed by the anastomosis of a branch of the occipital with the vertebral. The spinal branches of the cerebrospinal unite with the ventral spinal artery. The basilar artery passes forward, gives rise to the posterior cerebral and internal auditory arteries, then divides, each branch giving off the anterior cerebral before anastomosing with the posterior communicating artery (Fig. 2). The anastomosis of the posterior communicating arteries with the basilar and the connection of the two anterior cerebrals (anterior communicating artery) completes an arterial circle that surrounds the hypophysis and is called the circulus arteriosus (Circle of Willis).

The other terminal branches of the common carotid artery, the occipital and external carotid, contribute an indirect blood supply to the brain through numerous anastomoses with the internal circulation. The most important of these is the anastomatic artery, which connects the internal carotid with the internal maxillary artery (continuation of the external carotid). Himwich,[7] *et al.*, states that two-thirds of the carotid supply to the brain comes from the anastomatic artery.

Materials and Methods

Healthy, mixed breed dogs weighing 20-66 lbs. were selected for these experiments. All animals were anesthetized with sodium pentobarbital.

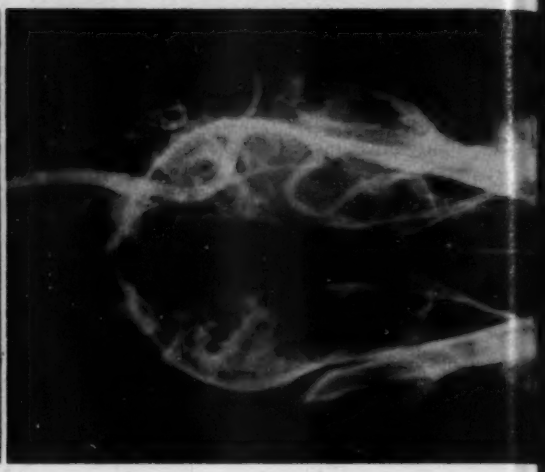
Injections of contrast mediums were made into the common carotid artery which was isolated surgically. All dogs were closely observed during, and for 20-30 minutes following, injections for any reactions. The reactions noted were designated (+), (++), (+++), and (++++) in order of severity. The following criteria were used:

1. (+) —slight, mild tremors of head and neck muscles with or without slight alterations of respiratory rate and depth.
2. (++) —slight to moderate muscular tremors, followed by eupnea (ten to 15 seconds), then hyperpnea for two to three minutes.
3. (+++) —severe convulsive seizures of the head and neck muscles lasting longer than 30 seconds accompanied by eupnea (ten to 15 seconds) and hyperpnea (five to 30 minutes).
4. (++++)—severe convulsions accompanied by respiratory embarrassment to a point where oxygen admistration was necessary.

Twenty of the 22 experimental animals were allowed to survive for periods up to three weeks following angiography. During that time they were closely observed for any clinical manifestations of brain injury. Two of these brains were sectioned and examined microscopically for evidence of vascular damage. Twelve animals were euthanatized, and the arteries of the brain injected with vinyl or latex and dissected. The dissection findings were correlated with the angiograms.

Angiography (two injections each series) was repeated once in two animals and twice in one dog. It was repeated in two of the six clinical cases.

Hypaque and Hypaque-M were used as contrast medium in 12 and 14 series respectively. A total of 24 injections of Hypaque and 29 injections of Hypaque-M were made. From 7-25 cc. of Hypaque and 3-8 cc. of Hypaque-M were used for each injection.



Figs. 3 and 4—Radiograms made three seconds following the injection of 10 cc. of Hypaque into the common carotid artery. Note the absence of opaque medium in the cerebral vessels.

Serial radiographs were exposed following each injection with a rapid cassette changing machine (seriograph)*. Two to six radiographs were obtained at one-half to two second intervals with the first exposure being made approximately one-half to one and one-half seconds after beginning the injection. Both lateral and dorso-ventral positions were used, the two positions being considered as a complete series.

Injections were made with a 30 cc. glass syringe, various sizes of polyethylene and rubber tubing and one inch (16-20 ga.) hypodermic needles. Different rates of injection were used with as constant pressure as possible with the hand. An assistant held the animal's head firmly to prevent any movement in case of a severe reaction.

Digital pressure over the needle puncture site was used to control post injection hemorrhage and when necessary, the site was closed with 6-0 arterial silk. The surgical area was closed in a routine manner.

*Sanchez-Perez automatic seriograph
Automatic Seriograph Corporation
College Park, Maryland

Experimental Procedure and Results

In five series the common carotid artery was isolated by making a ventral midline incision in the middle of the neck, then separating the sternohyoid and sternothyroid muscles. About one inch of the artery was carefully dissected free from the common sheath it shares with the vasosympathetic trunk.

The syringe, tube and needle were filled with the desired amount of Hypaque, a small amount of heparin drawn into the end of the needle and the tube clamped with a spring type tubing clamp. The needle was inserted to the hub into the common carotid artery and anchored firmly with a strong ligature. The tubing clamp was released and the injection made.

In three of these series a rapid injection of 10 cc. of Hypaque was made, but no contrast was seen in the cerebral vessels. Due to the small size of the internal carotid artery when compared to that of the external carotid, most of the medium passed through the extracranial vessels (Figs. 3 and 4). Reactions from these injections were recorded as mild or (+).

In the other two series where 20 and 25 cc. injections were made with greater plunger pressure, visualization of the cerebral vessels was obtained, but the reactions were rather severe. Of the four injections made, reactions in three were regarded as (+++) and one as (++++). The dog in which the two (+++) reactions occurred died before recovering from the anesthesia, although the subject appeared normal 20 minutes following the injections. The animal was disposed of by mistake before necropsy could be performed. It was necessary to administer oxygen to the other animal after the second injection, but this dog appeared clinically normal after recovery from the anesthesia. In addition to the severe reactions, the lingual artery was filled with the contrast medium, making visualization of the cerebral vessels on the dorso-ventral radiograph more difficult (Fig. 5).

In view of these difficulties it was decided to temporarily ligate the external carotid artery in order to shunt the contrast medium into the internal carotid circulation. The termination of the common carotid artery was difficult to isolate through a ventral

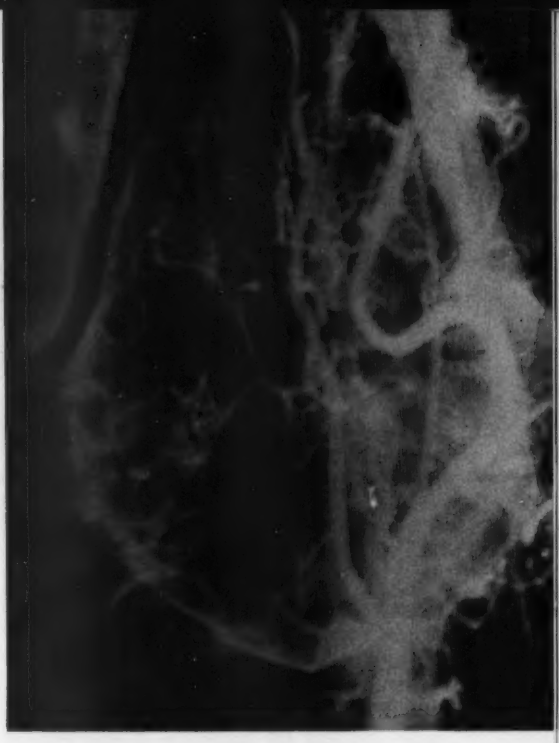


Fig. 5 (above)—Dorso-ventral radiograph exposed four seconds after the start of a very rapid 20 cc. injection of Hypaque into the common carotid artery. Note the lingual artery and its branches partially obscuring the Circle of Willis on the right side.

Fig. 6 (right)—Incision site for the lateral surgical approach to the termination of the common carotid artery.

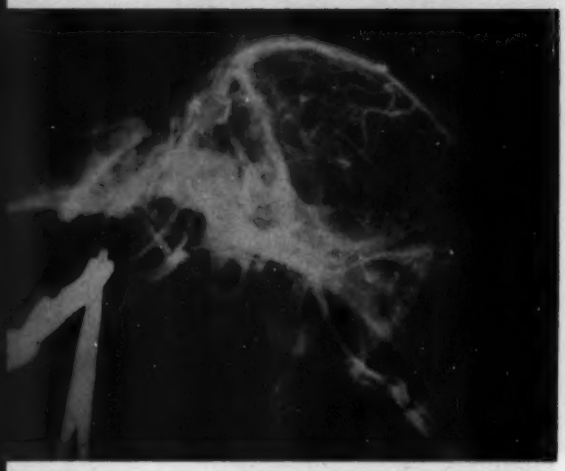


Fig. 7—Radiograph exposed eight seconds after the start of a rapid injection of 9 cc. of Hypaque. The external carotid artery is temporarily ligated. Note that most of the medium is seen in the venous circulation.

approach so a lateral approach was used. A three inch skin incision was made beginning about one inch anterior to the most prominent part of the wing of the atlas and extending down the neck, passing just below the wing of the atlas and above the external jugular vein (Fig. 6). The musculature was bluntly dissected and the artery exposed. The common carotid artery was separated from the vagosympathetic trunk and followed forward to its termination. A bulldog arterial clamp was placed temporarily on the external carotid artery and injection made as previously described. After injection, the clamp was removed, hemorrhage controlled, and the wound closed routinely.

In seven series (14 injections), 7-10 cc. Hypaque was used per injection. Reactions were regarded as (+) following five injections, (++) following seven injections and (+++) following two injections. All animals were observed for at least 24 hours following angiography and no clinical evidence of brain damage was noted. Reactions were no more severe following repeated injections than with the initial injections.

The cerebral vessels were seen in all angiograms but with rapid injection the medium was seen in the venous circulation as early as two seconds after the beginning of injection. This partially obscured the arterial pattern. With slower injection rates, the medium could be seen longer in the arterial side, but visualization was limited to one side. Unilateral angiograms can be of definite diagnostic value in the dog but it was hoped that bilateral angiograms could be safely obtained, especially in the dorso-ventral position. In addition, the density of the cranial bones of the dog limited the sharpness of the angiograms. Attempts to darken the bone by increasing the kilovoltage darkened the contrast medium in proportion. Venograms of fair quality were obtained from these animals six to ten seconds following injection (Fig. 7).

In an attempt to obtain angiograms with greater contrast, Hypaque-M was used for 29 injections in 14 series, even though the manufacturer states that this preparation is contraindicated in cerebral angiography. The same technic as previously described with temporary external carotid ligation was used in all animals. There were no reactions following three injections, 16 (+), five (++), three (+++), and two (++++) reactions.

Brains from two of the more severe reactors were examined microscopically. One animal showed a (+++) reaction following each of two injections of 5 cc. Hypaque-M and the other showed (+++) and (++++) reactions respectively following 6 cc. injections. One brain was removed 29 hours after angiography and the other at 72 hours, both animals appearing clinically normal upon recovery from the anesthesia. The only abnormality noted upon microscopic examination was enlarged perivascular lymphatic spaces. These were considered to be shrinkage due to formalin fixation.

In one other animal where the unused portions of several bottles of Hypaque-M were combined for one injection, an extremely severe (++++) reaction resulted. This animal was given 125 cc. of 0.2%

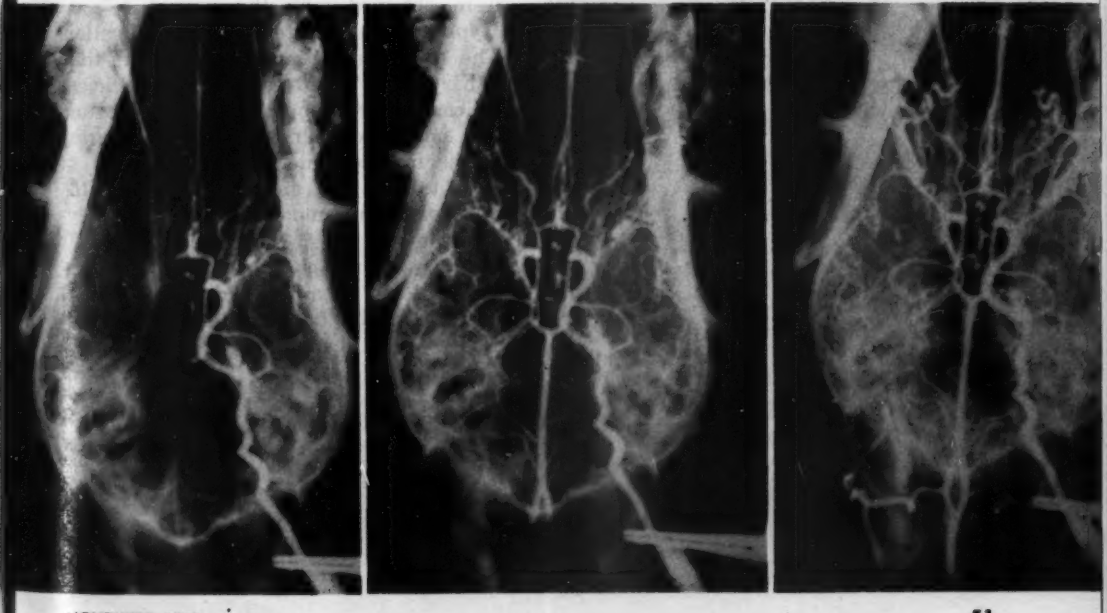
trypan blue intravenously following angiography, in an attempt to ascertain if vascular damage had occurred. This animal died of respiratory failure as the last of the trypan blue was given. Moderate staining of the brain tissue was noted upon gross examination. Whiteleather and DeSaussure[6] indicated, however, that the trypan blue staining technic might not be as good an indication of vascular damage as neuromuscular reactions. The severity of the reaction quite possibly was due to the use of old Hypaque-M, since only a (++) reaction was noted using freshly opened medium for the first injection of the series.

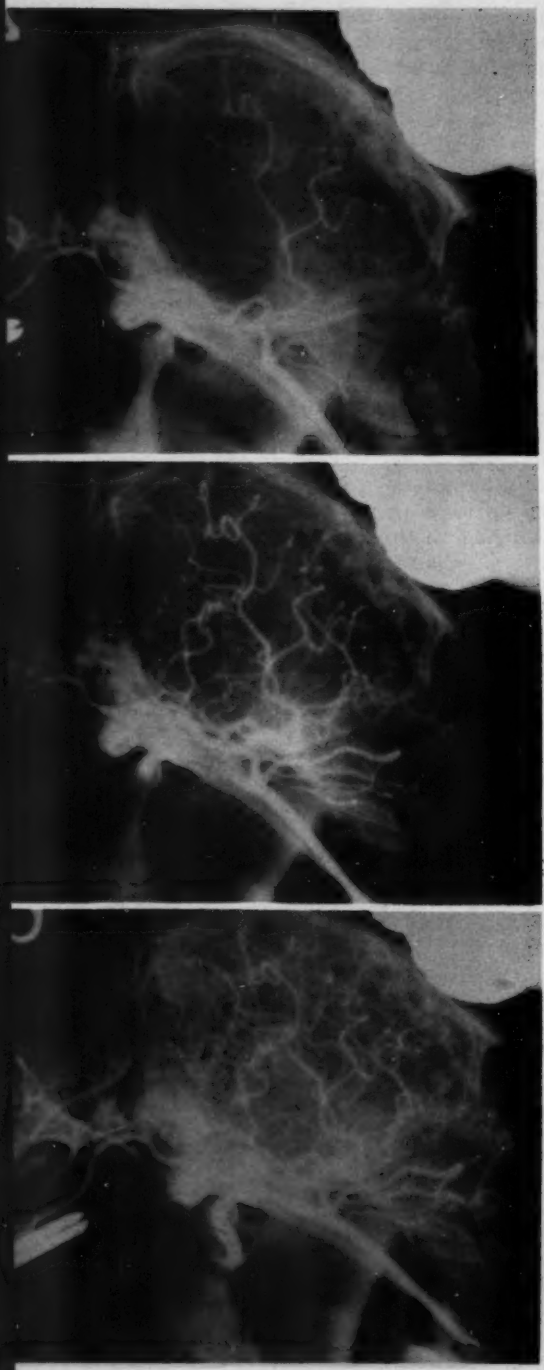
Excellent arteriograms were made with Hypaque-M with temporary external carotid artery ligation. Vascular patterns could be easily visualized especially when the kilovoltage was increased eight to ten percent over that normally used for radiographs of the skull.

In dogs weighing from 20-35 lbs., a rapid 5 cc. injection of Hypaque-M produced a bilateral view of the cerebral arterial system, and in most instances the arteries arising from the basilar artery were also visualized (Figs. 8, 9 and 10). By slowing the injection rate slightly unilateral angiograms were made (Figs. 11, 12 and 13). With rapid injection a unilateral radiograph could be made at about two seconds and then a bilateral one made about two seconds later (Fig. 14 and 15). From a diagnostic standpoint unilateral angiograms would seem more desirable on the lateral view and bilateral angiograms on the dorso-ventral view.

The viscosity of the Hypaque-M makes rapid injection more difficult than with the Hypaque. Also, it passes through the capillary beds more slowly. In the average series the arteries could be readily identified up to about six seconds following the beginning of injection. After this time interval, contrast could be seen in the venous return, although no distinct venograms were seen as with the Hypaque. The

Figs. 8-9-10 (left to right)—Serial radiographs following a very rapid injection of 5 cc. of Hypaque-M. Fig. 8—Radiograph exposed 1.5 seconds after start of the injection. Fig. 9—Radiograph exposed at three seconds. Fig. 10—Radiograph exposed at 4.5 seconds. Note the retrograde flow into the ventral spinal and vertebral arteries and also the increased contrast in the interval between the major vessels.





Figs. 11-12-13 (read down)—Serial radiographs following a rapid injection of 5 cc. of Hypaque-M.
Fig. 11—Radiograph exposed 1.5 seconds after start of the injection.
Fig. 12—Radiograph exposed at three seconds.
Fig. 13—Radiograph exposed at 4.5 seconds. Note that the medium has progressed into the terminal arterioles and capillaries, accounting for the increased contrast seen in the interval between the major vessels. Visualization is still primarily unilateral.

ideal time for obtaining one arteriogram if the automatic casette changer were not used would be two to three and one-half seconds. These times are only average as consistent results were not obtained using manual pressure and animals of different body weights.

Retrograde flow of the medium through the anastomatic artery into the extracranial circulation was seen in all but five of the series (Fig. 16). In two series the anastomatic artery was of such caliber that most of the medium flowed through it rather than into the cerebral circulation (Fig. 17 and 18).

In these experiments the best results were obtained with the use of 5-7 cc. Hypaque-M and external carotid ligation. The 18 ga. needle gave better results than either the 16 or 20 ga. It is of sufficient caliber to allow the desired flow of medium and small enough not to require suturing of the injection site. A 14-16" length of latex tubing (¼" inside diameter, 1/16" wall) was found more desirable than polyethylene or other sizes of rubber tubing. It is strong enough not to bulge under pressure and can be autoclaved.

A definite cc./lb. dosage schedule could not be established. Smaller dogs require more medium per lb. of body weight than larger dogs.

Clinical Cases

Angiography was performed on six dogs showing clinical symptoms of intracranial pathology. Four of these animals were

Figs. 14-15 (above)—Serial radiographs following the rapid injection of 5 cc. of Hypaque-M. Fig. 14—Radiograph exposed two seconds after start of the injection. Note unilateral filling. Fig. 15—Radiograph exposed at four seconds. Note bilateral filling.

Fig. 16 (right)—Dorso-ventral radiograph exposed 3.5 seconds after the start of injection of 7 cc. of Hypaque-M. Note the complete filling of the internal maxillary and external carotid arteries from retrograde flow through the anastomotic artery.

Figs. 17-18 (below)—Radiographs exposed at three seconds following the start of a rapid injection of 5 cc. of Hypaque-M. Note the large size of the anastomotic artery and the absence of contrast in the cerebral vessels.

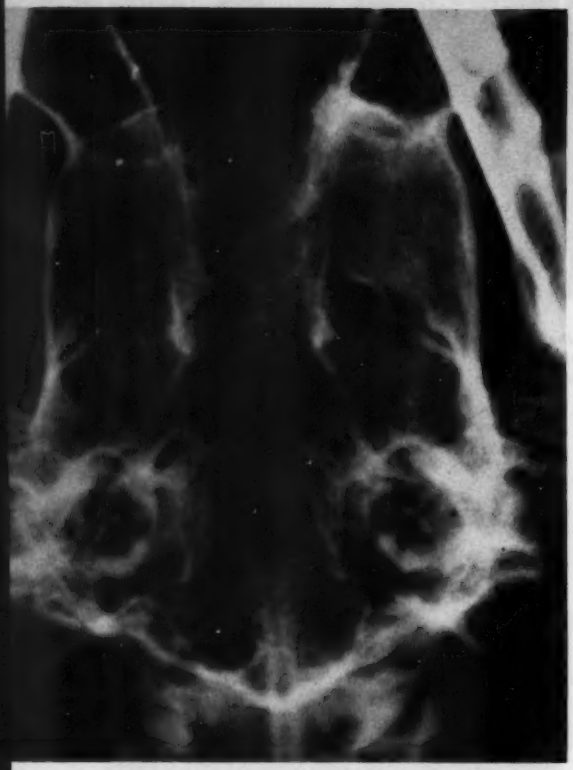


Fig. 19 (above)—Dorso-ventral radiograph of clinical case. Note the area of increased density in the right antero-lateral aspect of the cranial cavity.

lethargic and in a poor general condition while two were active and appeared normal except during periodic convulsions. One series was performed on each of four animals and two series were performed on two animals all using Hypaque-M and external carotid ligation. Excellent angiograms were obtained in all cases and reactions were no more severe than with the healthy experimental dogs. Two (+++) and no (++++) reactions were recorded.

Five of the six dogs on necropsy showed lesions of a functional nature rather than a gross structural defect, consequently these lesions were not seen angiographically.

The other case was a five year old female boxer with a history of convulsions for a six month period. These convulsions had become more frequent and progressively more severe during this period. A clinical neurological examination was negative and between seizures the animal appeared normal. Cerebrospinal fluid was examined and found negative for albumen and bacteria although a slight increase in pressure was noted. Radiographs in lateral and dorso-ventral positions were made of the head. A small area of increased density was noted in the antero-lateral aspect of the cranial cavity on the dorso-ventral radiograph (Fig. 19).

Six dorso-ventral angiograms were made at one second intervals following the injection of 6 cc. Hypaque-M. The procedure was repeated and six lateral angiograms made. The lateral angiograms revealed nothing of significance (Fig. 20). A triangular area of excessive contrast was seen bordering on the antero-lateral aspect of the cranial cavity of the four-second dorso-ventral angiogram (Fig. 21). On the seven-second picture this excessive contrast was still present while other vessels in the area were void on contrast (Fig. 22). This was considered to be a vast bed of arterioles and capillaries, causing retention of the medium. Since this was not seen on the lateral pictures, it was assumed that the lesion had a much greater dorso-ventral than lateral

Fig. 20 (below)—A lateral radiograph exposed four seconds following the start of injection of 6 cc. Hypaque-M. No abnormalities are seen.

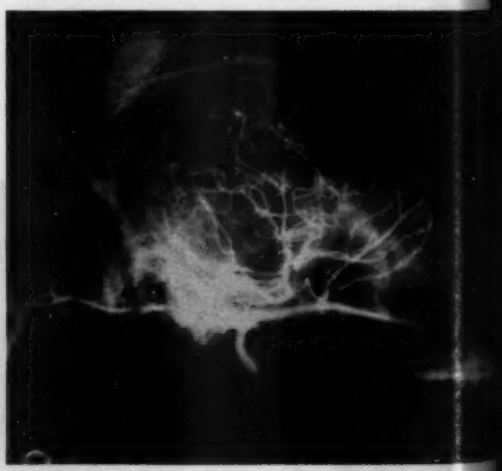
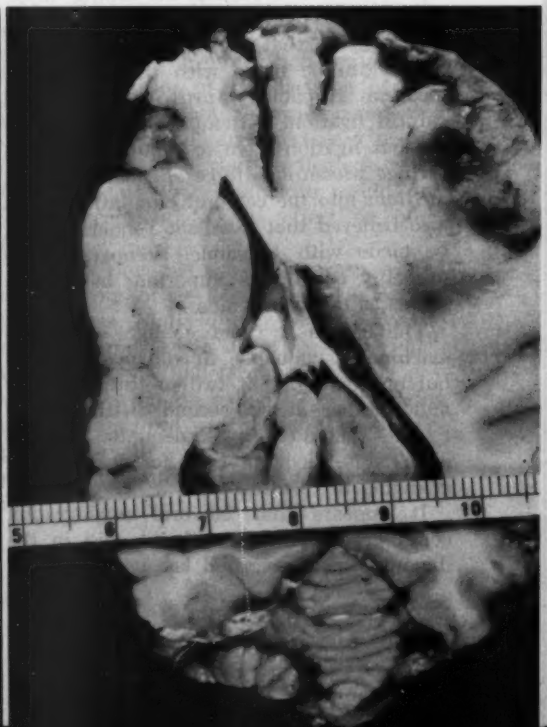


Fig. 21-22 (above)—Serial radiographs exposed at four and seven seconds respectively after the start of injection of 6 cc. Hypaque-M. Note the area of increased density in Fig. 21 and the retention of the medium in the suspected area in Fig. 22.

Figs. 23-24 (below)—Photographs of the brain showing the position of the lesion.



extent. According to Lima,[1] one of the most important features of a meningoma is the appearance of the opaque medium in stasis in the newly formed vessels. On the basis of this information and the fact that the angiograms indicated a lesion involving the periphery of the brain, a tentative diagnosis of meningoma was made.

The dog was euthanatized and necropsy performed. Examination of the brain revealed a thickening of the dura over the dorso-lateral aspect of the frontal lobe (Figs. 23 and 24). The lesion was approximately 3 x 4 cm. in size and approximately 0.4 cm. thick. Histopathological examination confirmed the diagnosis of meningoma.

Conclusions

Injection of Hypaque-M into the common carotid artery with temporary external carotid ligation has proven very satisfactory for use in cerebral angiography in the dog. Excellent contrast is produced with little clinical evidence of toxicity. There is, however, need for further toxicity studies incorporating trypan blue and histological methods.

With further study on the timing, injection rate, radiographic exposure and dosage, it is believed that excellent cerebral angiograms can be made with the use of the medium Hypaque, employing external carotid ligation. Attempts at angiography without ligation seem to require too much syringe pressure to force adequate contrast medium into the cerebral circulation. It is also believed that excellent venograms can be made with Hypaque. Venograms are probably equally as important as arteriograms as diagnostic aids.

The use of a rapid change seriograph machine is valuable in diagnostic work, but one exposure at two to three seconds and another at six seconds with regular casettes should prove adequate. (Three seconds is adequate time for the manual changing of casettes.)

It appears that cerebral angiography could become a very valuable aid in the diagnosis of intracranial lesions in the dog and, therefore, lead to the surgical correction of some of them. However, angiographic findings must be evaluated on many clinical cases and correlated with the necropsy or surgical data before reasonable certainty in diagnosis can be expected. Angiography can probably be performed with greater safety if only unilateral angiograms are made but until further studies are made in the dog a bilateral angiogram, especially in the dorso-ventral position, seems to be justified.

A thorough neurological examination is a "must" on clinical cases. Through it, cases adaptable to angiography could be better selected.

Summary

A technic developed from experimental studies with cerebral angiography has been described. The injection of 5-7 cc. of Hypaque-M into the common carotid artery, with external carotid ligation, has given excellent results in the dog. The use of this technic to arrive at a correct diagnosis on one clinical case has been described.

REFERENCES

1. Lima, P. Almeida, Cerebral Angiography. Oxford University Press, London, Eng., 1950.
2. Ecker, A., The Normal Cerebral Angiogram. Charles C. Thomas, Springfield, Ill., 1951.
3. Ecker, A., and Riemenschneider, P. A., Angiographic Localization of Intracranial Masses. Charles C. Thomas, Springfield, Ill., 1955.
4. Carton, Charles A., Cerebral Angiography in the Management of Head Trauma. Charles C. Thomas, Springfield, Ill., 1959.
5. Whiteleather, J. E., and DeSaussure, R. L., New Contrast Medium (Hypaque) for Cerebral Angiography. *Radiology*, (67:537-543, 1956.)
6. DeLaTorre, E., Netsky, M. G., and Mescham, I., Intracranial and Extracranial Circulations in the Dog: Anatomic and Angiographic Studies. *Am. Jour. of Anat.*, (105:343-361, 1959.)
7. Himwich, Williamina A., Costa, E., Canham, R. G., and Goldstein, S. L., Isolation and Injection of Selected Arterial Areas in the Brain. *Jour. Applied Physiol.*, (15:303-306, 1960.)
8. Miller, Malcolm E., Guide to the Dissection of the Dog. Edwards Brothers Inc., Ann Arbor, Michigan, 1955.
9. Bradley, O. C., and Graham, Tom, Topographical Anatomy of the Dog. The MacMillan Co., New York, 1959.
10. Sisson, Septimus, and Grossman, J. D., The Anatomy of the Domestic Animals. W. B. Saunders Co., Philadelphia, 1953.

Further Studies on the Effect Of Malucidin on Pregnancy

LEON F. WHITNEY, D.V.M.

The first paper on the interesting property of Malucidin (a yeast extract) in causing resorption of fetuses was published in VETERINARY MEDICINE in the January, 1959 issue.[4] At that time 43 bitches had been treated with varying amounts of the substance, some once, some many times, each time without impairment of reproductive capacity. It was stated that one bitch aborted.

Malucidin in a soap solution has been available to veterinarians as a treatment for skin disorders in dogs for several years. After my first paper on the subject of resorption and a previous one dealing with the treatment of coccidiosis in rabbits by the administration of enemas of the soap solution,[3] several veterinarians wrote me they had tried the soap solution intravenously to attempt to bring about fetal resorption but that it did not achieve the desired result. At the outset therefore, it must be emphasized that in my hands, the Malucidin used in effecting resorptions was an aqueous substance, sufficiently refined and concentrated for intravenous injections, and not the soap-base product.

Furthermore, it seems advisable at the present time to restate the fact that although the injectible form of Malucidin was administered in large amounts by certain other avenues, in no case was it effective in producing resorption except by the intravenous route. Pregnant bitches which had been liberally dosed externally for skin diseases with the soap solution were also unaffected. Work is now under way to ascertain whether at higher concentrations and in larger amounts, there are other ways of producing resorptions with Malucidin than by intravenous injections.

Our next major study, we felt, should be an endeavor to determine the period at which resorption stopped and abortion began, and to make observations on: (1) the behavior of the bitch, (2) the time following injection when the parturition commenced, (3) the condition of the placenta, (4) the condition of the uterus following completion of birth, (5) the dosages necessary to produce results, (6) contraindicated conditions, (7) whether Malucidin would prevent conception, (8) its effect on other species.

In the previous paper[4] it was pointed out that one of the physiological effects of intravenous Malucidin injections was to cause a rapid fall in blood pressure, which in some as yet undetermined way, is prevented by what we called a "desensitizing dose," the size of which we found was approximately 10% of the main dose and administered about ten minutes before the main dose.

*In my previous paper I stated that rats were refractive to 1 cc. doses of Malucidin. Since then, another investigator informs that using 600 rats, and giving larger doses, he had results similar to mine with dogs.

Abortion

Our first bitch treated late in the gestation period with the injectible form of Malucidin aborted. Bitches injected before the 44th day all resorbed. Our next step therefore, in our study of its effects, was to try to determine the time when resorption ceased and abortion began.

Eleven bitches between the 44th to 58th days of gestation were treated. Nine were Redbone Coonhounds, closely related and quite uniform in size, and two were large Beagles. Since the first bitch we had ever tested Malucidin on resorbed at 44 days of pregnancy and another later, on the 45th, we concluded that the 45th day is the approximate point, at the doses we administered, when resorption is not effected, but abortion is. However, one bitch in the present study, pregnant 44 days aborted, which caused us to revise our estimate.

Of the aborted bitches certain interesting facts have been observed. Two of the bitches whelped live puppies. One whelped one live, the other, two and in each case these puppies were the last to be born. The bitches weighed 56 and 65 lbs. respectively before becoming pregnant. Each received 25 cc. total of Malucidin solution. 10% of the dose was, as usual, given as a "desensitizing" dose, followed in five to ten minutes by the remaining 90%.

The longest time after injection when the first puppy was born was 25 hours, the shortest was 21. What influence causes the cervix to open was not investigated.

From this it will be seen that abortion begins in 23 hours, plus or minus two hours, following injection. From the start the bitch behaves as if something were disturbing her. Contraction of the uterus can be felt by one's hand held against the bitch's belly. Then a spell of comfort occurs for ten or 15 hours followed by the opening of the cervix and later, expulsion of the fetus.

The bitch does not behave like a bitch having a normal birth. At first there seems to be no vestige of maternal instinct. If permitted access to her kennel run, she walks around, squats and passes a puppy, often not bothering to smell it. She generally gives birth to the entire litter in less time than is required for producing a normal litter.

Toward the end of parturition, she begins to act more like a bitch with a normal birth, preferring to lie in her bed, licking the puppy and consuming the afterbirth.

Every puppy we have seen dropped, or those we have found in the beds, was entirely encased in its intact fetal membranes with the placenta surrounding it. The action of the Malucidin seems only to separate the placenta from the uterus. Many uteri have been preserved for study and are

TABLE 1. Effect of Malucidin Given During Pregnancy

Name	Weight	Day	Dose	Result	Puppies	Hours Later
Beagle, Twitch	35 lbs.*	49	5 cc.	no effect	4 live pups	
Gloria	86 " *	58	30 "	aborted	12 dead pups	22
Red Duchess	55 "	49	15 "	no effect	13 live pups	
Pauline	86 " *	58	20 "	no effect	10 live pups	
Winnie	84 " *	58	35 "	aborted	10 dead pups	22
Red Bobbin	60 "	52	15 "		no puppies	
Red Bobbin (repeat)	65 "	57	25 "	aborted	14 puppies, last 2 alive	
Toots	60 "	56	25 "	aborted	10 pups, last 1 alive	24
Racer	55 "	44	15 "	aborted	9 dead pups	25
Beagle, SuperAnn	25 "	59	5.5 "	aborted	4 dead pups	21
Singer	60 "	45	20 "	resorption	no pups	

*indicates pregnant weight

the property of the Yale Medical School.

The obvious fact is that something occurred within the uterus to separate the placenta from its attachments but also much fluid was absorbed from the uterus in the process. In no case have we found any retained placentas and remarkably quick recoveries by the bitch resulted. In premature births produced by accidents or other causes, the fetuses are expelled first, followed later by passage of placentas, or often by their retention, necessitating surgery and sometimes producing sterility. The effect of Malucidin is the reverse.

One of the interesting facts observed was the very small amount of bleeding and staining, much less, we thought, than occurs during normal births.

In a few bitches, after the second day following abortion, there appeared to be considerable discomfort from distended udders, manifested by a loss of appetite. It occurred to us to try some of these bitches as foster mothers. Every one welcomed the introduction of puppies and was a good mother. Our Beagle saved all seven puppies whelped by an old bitch whose puppies were valuable to us because of her excellent breeding and who could not nurse them herself.

In the case of several of our Redbone breeding bitches, which produced large litters, we divided the litters between the mother and an aborted bitch and were successful in raising most of the puppies.

The milk, therefore, of the aborted bitches seems to be in no way affected. One such bitch adopted a litter successfully after she had aborted on the 56th day.

A further study shows the effect of Malucidin on anemic dogs. When a bitch showed exaggerated signs of prostration after the initial 10% dose, we made a hemoglobin reading. On the scale of 17, her hemoglobin rated 7. A fecal examination revealed the presence of hookworms. She was dewormed twice at eleven day intervals. Two weeks after the second deworming she was again tested and her blood was found to rate 17. The 10% dose this time had almost no effect, nor the 90% remaining dose, either. The degree of prostration when there is any, appears to be linked with the degree of anemia, a fact we have now determined by many observations.

Doses

The results of our studies in the size of dose to produce resorption in the early stages and abortion in the later weeks, showed us that a larger dose was necessary to effect abortion than is required for resorption. All bitches weighed much more in the later stages. It would almost seem that the dose is proportional to the size of the total placentas rather than the size of the dog.

In our first paper we reported a 70 lb. bitch on which only 10 cc. of injectible Malucidin was effective at an early stage. In the last stages we found a minimum of 35 cc. was necessary to be a sure dose for an 84 lb. bitch well distended with puppies.

To be certain, we administer 1 cc. per 3½ lbs. of a bitch in early pregnancy and 1 cc. per 3 lbs. to one in later pregnancy. At this rate we have had no failure and no live puppies born.

Of the actual active principle in the solution, this is a small amount. There are less than 3% of solids in injectible Malucidin. Three percent of 35 cc. is about one gram.

As a Contraceptive

We attempted to determine whether Malucidin, injected intravenously, would have any value when given during the copulative period, as a contraceptive. Four bitches were injected two and three times, each dose administered on alternate days, with the doses sufficient to produce resorptions. There was no interference with conceptions, as Table II shows. The Malucidin was administered intravenously.

We are still uncertain of the physiological mechanism by which Malucidin produces its resorptive and abortive effects, and dilation of the cervix. Much pharmacological work has now been done on it, one author in a private study reporting that the only

TABLE 2. Effect of Malucidin Given During Copulative Period

Name	Weight	Dose	Times	Result
Racer Pup	55 lbs.	15 cc.	2	Became pregnant
Dark Pup	50 "	15 "	3	" "
Harriet	25 "	5 "	3	" "
Super Super Ann	26 "	5 "	3	" "

physiological effect he was able to determine was to cause a fall in blood pressure. That it causes the placenta to separate from the uterus is obvious. Dr. H.S.N. Greene's report in our first paper[4] stated: "In all instances the fetal portion of the placenta was completely necrotic and embryos could not be found. The cavernous layer of the decidua was grossly thickened and on microscopic examination thickening was found to be due to distention of the glands with mucoid material, together with old and fresh blood."

How resorption is completed in so short a time as two days in 44-day-old fetuses is also difficult to understand. Work done on autolysis of pig embryos *in vitro* by Long and Parkes in 1924[6] may shed some light on the process. They found that enzymes digested the embryos and the same process may occur within the uterus, that organ then absorbing the fluid product of the digestion.

A side observation, apart from the main objects of the study which may be useful to endocrinologists, was made. This interesting phenomenon concerns the interest which the bitches took in their aborted embryos, which we attribute rightly or wrongly to prolactin proliferation. Generally the bitches we observed aborting in the eighth week of pregnancy dropped their fetuses about the kennel runs and paid no more attention to them than their own stools. We have read opinions of students of dogs that it is the odor of the placenta and/or the amniotic fluid which attracts the bitches to consume the fetal membranes and placenta, but either there is no such attractive odor in these early aborted fetuses or odor is not the motivating attraction. Pregnant bitches placed in the runs with those which aborted were uninterested in the dead newly born puppies.

A bitch which aborted on the 56th day was uninterested in any fetus until almost the end of parturition, when she reluctantly began to lick at a dead puppy. By the time her last pup was born—it was still alive—she was quite normal and had removed the membranes and consumed the placentas of the three dead ones and had licked the one live and three dead puppies dry. The live one died.

A bitch which aborted on the 58th day showed no interest in the first dead pup, but in three hours became maternally inclined and cleaned up the first dead pup and all of the rest. Another which aborted on the 57th day dropped most of her puppies about the run, but became interested in the last five, two of which were barely alive and died shortly after birth.

By aborting a series of seven bitches at various times during the eighth and ninth weeks of gestation, we learned that before the 56th day none of the bitches we aborted showed maternal interest until near the end of parturition, as evidenced by their cleaning their puppies, while those aborted at the 58th day and later were natural mothers.

Effect on Sheep

During the breeding season of sheep, five ewes were chosen for treatment with Malucidin. Until now only mice, dogs and rats* had been investigated and it was thought that a species maturing only one or two offspring should also be studied. If Malucidin was effective in one bovine species, it might be in another. And if it also is effective in meat cattle and swine, it could be useful in resorbing embryos in feeder cattle, thus enhancing their value at slaughter.

Three nonpregnant ewes had been first injected, one each by a different route: one intraperitoneally, one intravenously, and one intramuscularly. The observed reactions were surprisingly like those exhibited by bitches.

The five ewes in the experiment were treated at different times. Each was marked on the day of mating. One was dosed on the 60th day of pregnancy, the other four

during the last two months. These ewes were given 1 cc. to 5 lbs. of body weight. We used scrubs, all of which weighed between 65 and 85 lbs. The one injected at 60 days did not lamb. That she was pregnant and resorbed is probable because all of the ewes in our flock of 35 except this one lambed. The four injected in the latter stages of pregnancy all aborted. one losing a set of twins. All of the lambs were dead.

Effect on Cats

Since veterinarians inquire whether Malucidin is effective in cats as it is in dogs, we used five cats in all stages of pregnancy. Each was first anesthetized with pentobarbital sodium and palpated to be certain of pregnancy. In the unconscious condition it was much easier to find a vein in the cats. Two of the cats had lumps about the size of English walnuts and one had lumps about one half inch in diameter. The other two had well-formed kittens. The three cats in the early stages of pregnancy were given 2 cc. each; the other two were given 3 and 3½ cc. respectively. Each received 10% of the dose five minutes before the main dose.

The results paralleled those with bitches. The three early cats all resorbed. The other two aborted, but one ate nearly all of her kittens. We did not observe the number of hours they took to abort because injections were given in the late afternoon and both had kittens during the next night.

Malucidin has been studied pharmacologically by Dr. J. R. DePalma and associates of Hahneman Medical School in Philadelphia. In a personal communication from Dr. DePalma it is stated that beyond causing a drop in blood pressure, Malucidin injected intravenously has a low toxicity, that on administration of a small dose, tachyphylaxis develops, a phenomenon called in my previous paper "desensitization." Following are Dr. DePalma's findings:

Cardiovascular. Malucidin had no effect on the heart rate, had no effect on carotid occlusion reflex, no effect on the rate, amplitude or shape of the electrocardiogram. It was observed that in doses sufficient to cause death, the heart stopped before respiration.

Action on Smooth Muscles and Ganglionic Transmission. Results of a study on smooth muscle or autonomic ganglia indicate that Malucidin has no significant pharmacological effects. Malucidin has no effect upon the response of the uterus to epinephrine and histamine.

Effect on Somatic Nerve and Skeletal Muscle. Malucidin given intravenously in doses up to 20 ml./kg. had no direct effect upon the muscle, the nerve, or nerve-muscle transmission. This is also evidenced by the fact that when given intravenously to unanesthetized dogs it did not produce any muscular tremors, weakness, or impairment of gait.

Effect on the Central Nervous System. Effects on the central nervous system were observed by placing two white mice (25 gm.) in activity cages. Each animal served as its own control for 15 hours. Then 0.5 ml. Malucidin (a sublethal dose) was injected and the animals again observed for 15 hours. No decrease in the normal spontaneous activity of the mice was noted after Malucidin. This correlates with the absence of C.N.S. activity as observed upon injection of Malucidin I.V. to unanesthetized animals (dog and rabbit).

From these findings Dr. DePalma concludes that the main pharmacological action of parenterally administered Malucidin is a depression of arterial blood pressure. On repeated successive doses of Malucidin this blood pressure lowering property shows tachyphylaxis.

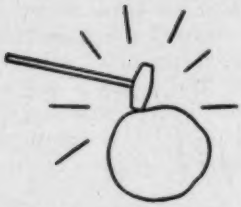
Conclusions

Malucidin in 3% solution and at appropriate intravenous doses produced resorption of fetuses during approximately the first two-thirds of pregnancy in bitches, and abortion when injected during the last one-third of pregnancy.

Parturition began 23 hours, plus or minus two hours, after the injection. Aborted puppies were in every case surrounded by a placenta and the fetal envelopes.

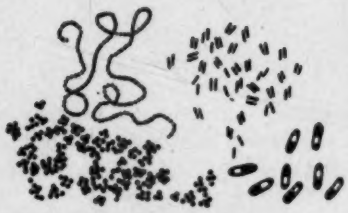
Solves complex problem of OTITIS THERAPY

TYMPACAINE



INDESTRUCTIBLE SULFONAMIDE

Mafenide Hydrochloride . . . potent sulfonamide *not inactivated* by pus, blood, cellular debris or PABA



WIDE-SPECTRUM SULFONAMIDE

Highly effective against a wide range of pathogenic bacteria . . . *even problem pathogens* like Pseudomonas and Staphylococcus.

PROLONGED TOPICAL ANESTHESIA

Relief from pain is *quick, profound, prolonged* . . . benzocaine stops scratching and thus reduces the spread of infection . . . hastens healing.

PENETRATING VEHICLE

Propylene glycol is eleven times more penetrating than glycerin . . . carries medication to *every tiny crevice.* Urea encourages debridement.

TYMPACAINE Ear Drops Warren-Teed, ½ oz. plastic applicator bottles, cartons of 12 . . . detachable label for dispensing.

WARREN-TEED
Veterinary Products
Sold Only to Graduate Veterinarians

THE WARREN-TEED PRODUCTS COMPANY, DIVISION OF VETERINARY MEDICINE, COLUMBUS 8, OHIO
DALLAS • LOS ANGELES • PORTLAND • CHATTANOOGA

The milk of the aborted bitches was unharmed and several were used as foster mothers.

Small doses of Malucidin produced considerable prostration in anemic dogs, but deworming for hookworms, with subsequent return of blood to normal, remedied the condition.

Dose required for successful resorption was 1 ml. per 3½ lbs. of body weight; for abortion, 1 ml. per 3 lbs. One gram of dried Malucidin is capable of aborting an 84 lb. bitch.

Injected intravenously during the copulative period, Malucidin has no effect on the prevention of conception.

In abortions occurring before the 56th day of pregnancy (normal time of gestation is 61 days) the bitches showed no maternal behavior, while those aborted the 58th day or later were maternal even toward the dead puppies.

Aborted bitches were in no way injured, even by repeated abortions; their reproductive capacity was in no way diminished.

The effects of Malucidin on ewes and female cats were studied and found to parallel those obtained in bitches.

Pharmacological study of Malucidin shows its principle effect is to cause a drop in arterial blood pressure, that it has a low toxicity, and in small doses produces tachyphylaxis.

The author acknowledges with deepest gratitude the assistance and encouragement of his associates on the Yale Medical School faculty, the cooperation of Dr. J. R. DePalma and especially the cooperation of his assistant, William Evers.

REFERENCES

1. Parfentjev, I. A., A Fraction of Commercial Yeast Which Protects Against Infection. *Yale Jour. of Biology and Medicine*, 26:75, 1953.
2. Parfentjev, I. A., Yeast Protein With Antibiotic Properties. *Federation Proceedings*, 16:428 (March), 1957.
3. Whitney, L. F. and Arch, R., Experiments with Yeast Antibiotic on Pigeons and Rabbits Having Secondary Bacterial Septicemia Due to Infection by Coccidia. *Vet. Med.*, 52:247-249 (May), 1957.
4. Whitney, L. F., The Effects of Malucidin on Canine Pregnancy. *Vet. Med.*, 54:25 (January), 1959.
5. Long, C. H. N., and Parkes, A. S., On the Nature of Fetal Reabsorption. *Biochemical Jour.*, 18:890, 1924.

Relief of Egg Bound Birds

(Continued from page 39)

A blunt-pointed probe is then inserted into the oviduct opening and down to the egg shell. Using a circular motion the opening is gradually enlarged until the shell is readily visible . . . a small amount of lubricant is introduced and using gentle pressure the egg is delivered. We routinely introduce a small amount of antibiotic ointment into the distal portion of the oviduct and the cloaca and discharge the bird several hours after recovery from the anesthetic.

All 11 patients treated in this manner made rapid recoveries and several good breeding birds were enabled to continue productive life.

Practitioners familiar with the use of ether in avian species may find its use quite satisfactory for this procedure, but it is important to remember that egg bound birds are under severe stress and must be handled and medicated as such. Careful induction of light anesthesia will be less dangerous than continued manipulation on an already weakened bird and will facilitate a "professional delivery" with a minimum of trauma and post-operative complications.

Summary

A successful technic for the relief of egg bound birds is described. The use of light general anesthesia, visualization of the oviduct opening, lubrication and gentle pressure have resulted in the delivery of an intact egg and complete recovery in the 11 cases treated.

REFERENCES

1. Beister, H. E. and Schwarte, L. H., Diseases of Poultry, 4th edition, pg. 935.
2. Keymar, I. F., Diagnosis and Treatment of Psitticine Disease. *Mod. Vet. Pract.*, 28-29 (Dec. 15), 1958.
3. Leonard, R. H., Tips on Parakeet and Canary Practice. *Jour. Am. Vet. Med. Assn.*, 136:8, 379 (April 15), 1960.
4. Stroud, R., Stroud's Digest on Diseases of Birds, 142-145, 1943.
5. Feyerabend, Your Budgie's Health Book, 15.
6. Coffin, David L., Angel Memorial Parakeet and Parrot Book, 15.
7. Gandal, Charles P., Satisfactory General Anesthesia in Birds. *Jour. Am. Vet. Med. Assn.*, 128, 332-334 (April), 1956.

VM Small Animal Clinic

Here each month are published ideas, suggestions and comments picked up by VM Reporters.

Thorn's Adrenal Cortical Functional Test

As Modified by Martin, Skillen and Duebler

1. Obtain a heparinized blood sample.
2. Inject 10 units of ACTH intramuscularly.
3. Collect a second heparinized sample seven hours later.
4. Perform a direct eosinophil count on the two samples as indicated below.

Direct Eosinophil Count

1. Fill a WBC pipette to the 1 mark with well mixed heparinized blood (don't use oxalates because of lytic action on eosinophils) and wipe off the tip.
2. Dilute to the 11 mark with Hinkleman's Solution.

Hinkleman's Solution

0.5 g. Eosin Y.
0.5 ml. Concentrated Formalin.
0.5 ml. 95% phenol and dilute to 100 ml. with distilled water. (Solution obtainable by supplying Hartman Leddon Co., 5821 Market St., Philadelphia 39, Pa., with this formula.)

3. Shake pipette and allow to stand at least 15 min. Reshake at the end of this time and fill both sides of two hemocytometers.
4. Count cells showing distinct eosinophilic granules. The entire ruled area on both sides of both hemocytometers is counted. The factor is 2.78 times the total on all four ruled areas.

Interpretation

ACTH stimulates the output of cortical hormones which depress the eosinophils and lymphocytes and elevate the neutrophils along with the total count. Normal dogs will show a 75-90% fall in eosinophils at seven hours from the initial level.

With adrenal insufficiency no change or less than a 50% fall in eosinophils will occur at the seventh hour.

REFERENCES

Martin, J. E., R. G. Skillen, and M. J. Deubler, The Action of Adrenocorticotropic Hormone on Circulating Eosinophils in Dogs—A Proposed Screening Method for Evaluating Adrenal Cortical Function. *Am. Jour. Vet. Res.*, 15:489, 1954.

Huntsman, D. B., M. C. Doggett, and D. E. Holkamp, Hinkleman's Solution as a Diluent for Counting Eosinophils. *Am. Jour. Clin. Path.*, 31:91-92, 1959.

Best, W. R. and M. Samter, Variation and Error in Eosinophil Counts of Blood and Bone Marrow. *Blood*, 6:61, 1951.

N. Y. State Veterinary Meeting, 1960
F. E. McClelland, D.V.M. Presiding

Findings In Adrenocortical Insufficiency

Clinical signs: Apathy, weakness, anorexia, vomiting with or without blood, terminal anuria, hypotension, hemoconcentration, prostration.

Electrocardiogram: Cardiac conduction defects, peaked T valves.

Laboratory findings: High eosinophil count. Thorn's test shows inability of the adrenal cortex to respond to ACTH by lack of change in eosinophil count. Tendency towards hypoglycemia. Elevation of blood urea nitrogen. Lowering of serum sodium and chloride. Rise in serum potassium. Low keto-steroid output in the urine and failure to obtain a rise on the administration of ACTH. Blood levels should be low in keto-steroids.

Secondary insufficiency is due to hypopituitarism, similar clinical signs plus a deficiency in thyroid and gonad function. Thorn's test will show a marked drop in eosinophils.

REFERENCES

Freudiger, U., and S. Lindt. Beiträge zur Klinik der Nebennierenrinden-Funktionstörungen des Hundes. Schweizer Archiv. für Tierheilkunde, 100:363, 1958. Hadlow, W. G., Adrenal cortical atrophy in the dog. *Am. Jour. Path.*, 29:353, 1953. Marshak, R. R., G. D. Webster, Jr., and J. F. Skelley, Observations on a case of primary adrenocortical insufficiency in a dog. *Jour. Am. Vet. Med. Assn.*, 136:274, 1960. Rogoff, J. M., Experimental pathology and physiology of the adrenal cortex. Production of Addison's disease in laboratory animals. *Arch. Path.*, 38:392, 1942.

N. Y. State
Veterinary Meeting, 1960
F. E. McClelland, D.V.M.
Presiding

Feed Cotton for Foreign Bodies

Gastrotomy is often difficult or impossible in small puppies. When sharp objects such as needles and pins are swallowed, some nonsurgical attempt at removal is necessary.

Following a procedure first used in children, sharp objects have been safely passed by puppies after feeding cotton. Cotton batting is fluffed and mixed thoroughly with mashed potatoes, bread crumbs and finely-ground meat. For several days, 1½ ounces of the mixture is fed every three hours. With a little luck, the sharp object will be passed inside the cotton.

Ankylosing Spondylitis

Ankylosing spondylitis is an arthritic condition similar to rheumatoid arthritis in man. It must occur in at least 17% of all dogs but does occur in small breeds such fectious disease but no etiological agent has been isolated. It usually occurs in large dogs but does occur in small breeds such as Dachshunds and Spaniels. It is usually but not necessarily a disease of old age.

The owner may indicate sudden onset but a critical study would indicate a chronic situation. Careful questioning may reveal previous attacks. Stiffness or marked lameness might be a clue.

Treatment is cortocosteroid substances. Butazolidin (Jen-Sal) and aspirin or other salicylates may be used with good results. It is preferable to wean the patient onto aspirin as soon as possible.

J. Archibald, D.V.M.

Therapeutic Control of Diabetes Mellitus

A. Recommendations[a]

1. Exercise — must be controlled by hospitalization. Exercise lowers blood glucose and the requirement for insulin.
2. Diet — standardize to provide high protein content, low carbohydrate levels and fat to make up caloric needs. Supplement with multivitamins, B complex especially important. Add choline. Feed small amounts evenly throughout the day.
3. Acidosis and dehydration must be treated first with 0.5-1 gm. sodium bicarbonate and parenteral infusion of sodium chloride and glucose, 1 unit of insulin per gm. of glucose.
4. Insulin dosage — initially ½ to 1 unit per lb. based on blood or urine sugar level. Ready dose adjustment with regu-

lar or crystalline insulin. Feed in 30 minutes.

Insulins[2]			
Type	Speed of Action	Maximum Effect	Duration of Effect
Regular Crystaline	Rapid	1 hour	5-7 hours
NPH Globin Lente	Slow	8 hours	18-26 hours
Protamine Zinc Ultra Lente	Very Slow	8-12 hours	24-36 hours

a. Four hours after the initial dose of rapid acting insulin check urine or blood sugar levels and adjust the second dose of regular insulin accordingly. Feed within 30 minutes to avoid reactions.
   1. Urine retained over a prolonged period may not reflect current blood sugar levels.
   2. Continue dose adjustment till control is attained.

b. Regular insulin may be replaced by utilizing longer acting types at approximately the same unitage. Time the administration so the waning activity of regular insulin is compensated by the initiation of the maximal effect of the other type. This substitution reduces the number of injections.
   1. Repeated urine or blood sugar determinations are indicated, especially early in the morning or before feeding.

c. More exercise will reduce insulin requirements.

d. Infections will require an increase in insulin, best administered as regular insulin.
   1. Regular insulin may be added to globin, NPH, or lente insulin but not to protamine zinc insulin.

e. If the owner's supervision is inadequate, insulin dosage may be adjusted to remove the ketone bodies but leave a small amount of sugar in the urine.

B. Insulin Reactions
   1. *Signs:* Hunger, depression, weakness, unsteady gait, tremors, coma, convulsions. Onset depends on insulin type injected.
   2. *Laboratory Tests:* Quantitative blood sugar determination shows hypoglycemia. Screening tests inadequate. After emptying the bladder, the urine secreted should be free of sugar and ketones.

C. Diabetic Coma.
   1. *Signs:* Polyuria, polydipsia, anorexia, labored deep breathing, weakness, depression, coma. Onset is slow.
   2. *Laboratory Tests:* High blood sugar. Glycosuria, ketonuria.

D. Oral hypoglycemic agents have not given good results in our cases.

E. Samples for blood glucose must be analyzed at once or 30 mg. of sodium fluoride per 5 ml. of blood added to prevent sugar breakdown.

F. Normal blood glucose in the dog 70-100 mg./100 ml.

G. Diabetic dog-blood glucose fasting greater than 140 mg./100 ml. or more than 160 mg./100 ml. two hours after a meal.[3]

H. Caloric Requirements of Normal Dogs.[4]

Weight of Dog	Approximate Caloric Needs
10 lbs.	500
20 lbs.	850
30 lbs.	1000
40 lbs.	1200
50 lbs.	1500

1 gm. of fat furnishes 9 calories
1 gm. of carbohydrate furnishes 4 calories
1 gm. of protein furnishes 4 calories

REFERENCES

1. Bloom, F., The Blood Chemistry of the Dog and Cat. Gamma Publications, Inc., New York, p. 46, 1960.
2. Joslin, E. P., H. F. Root, P. White, A. Marble, The Treatment of Diabetes Mellitus. Lea and Febiger, Philadelphia, 10th Ed., 1959.
3. Kirk, R. W., Lecture Notes. 1960.
4. Wilkinson, J. S., Spontaneous Diabetes in Domestic Animals Part 1. *Vet. Rev. and Annot.* 3, Part 2, 69, 1957. Ibidem Part 2. *Vet. Rev. and Annot.* 4, Part 2, 93, 1958.

N. Y. State Veterinary Meeting, 1960
F. E. McClelland, D.V.M. Presiding

Preliminary Report on the Effect of Hypoglycemia on Listeriosis

MYRON F. ANDREWS, D. F. EVELETH and PATRIC K. McILWAIN
Agricultural Experiment Station
Department of Veterinary Science
Fargo, North Dakota

Recent work[2,3] has indicated the possibility that hyperglycemia might be a trigger mechanism that makes conditions favorable for the proliferation of *Listeria monocytogenes* from the mammalian host. In the work cited the administration of cortisone with its accompanying hyperglycemia appeared to increase the virulence of the bacteria to the host animal receiving the cortisone.

Since it is difficult to demonstrate the reason for the suggested relationship between hyperglycemia and the virulence of *L. monocytogenes*, an attempt was made to determine the effect of hypoglycemia in the host animal.

Materials and Methods

Twenty clinically healthy lambs were randomly divided into two groups of ten lambs each. All lambs were infected intravenously in the jugular vein with 5 cc. of a 24 hour culture of *L. monocytogenes* in trypticase phosphate broth. Each lamb in one group of ten was given 80 units of insulin (Lente Iletin — Lilly) subcutaneously at the time of infection and again 24 hours after infection. At 48 hours after infection, 40 units of insulin were given.

Blood samples were taken and temperatures were recorded five hours after infection and then at approximately 24 hour intervals.

Blood glucose levels were determined by the Somogyi[4] and the Folin-Wu[1] method. The Folin-Wu method gave somewhat lower levels than the Somogyi method, so an average of the two levels was taken.

Results

One lamb in the hypoglycemic group responded so dramatically to the insulin that the blood glucose had dropped to less than 10 mg. per 100 cc. blood five hours after the administration of insulin. Although no more insulin was administered to this lamb, it appeared to have received irreversible damage and was never able to stand. It died on the third day of the trial.

Twenty-four hours after infection the lambs in the control group were very depressed. They were recumbent or stood with their heads lowered and moved only

FIGURE 1

LISTERIOSIS AND HYPOGLYCEMIA

BLOOD GLUCOSE LEVELS

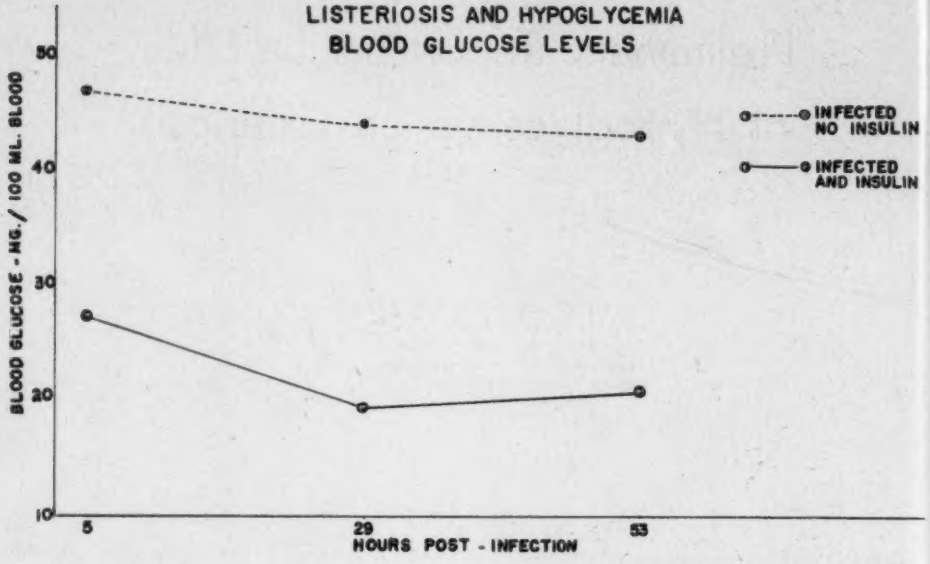
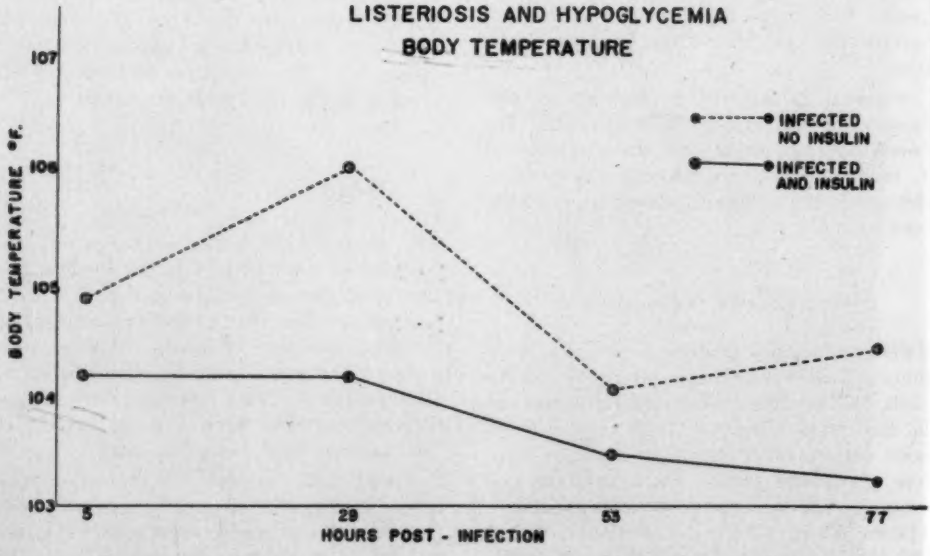


FIGURE 2

LISTERIOSIS AND HYPOGLYCEMIA

BODY TEMPERATURE



after considerable urging. With the exception of the lamb that responded so dramatically to the insulin, all lambs in the insulin group remained quite alert and continued to take some feed throughout the trial.

The results of the blood glucose determinations and the temperature recording are shown in Figures 1 and 2. A greater temperature rise was shown in the control lambs that had a blood glucose level in the normal range.

Discussion

These preliminary studies indicate some protective influence of hypoglycemia against infections of *L. monocytogenes*. They also indicate that the more severe clinical symptoms in hyperglycemic animals[2,3] are not due to hyperglycemia acting simply as a stress on the host.

Further work is required to determine the mechanism of the effect of blood glucose on *L. monocytogenes* and to show whether hypoglycemia will change the clinical course of a natural infection of listeriosis.

Summary

Twenty clinically healthy lambs were given *L. monocytogenes* by intraveneous injection. Ten of these lambs were given insulin to lower the blood glucose. The lambs receiving the insulin seemed to receive some protection against the infection, as indicated by clinical symptoms and temperature rise.

REFERENCES

1. Folin, Otto, and Hsien-Wu, A Simplified and Improved Method for Determination of Sugar (In Blood Analysis). *Jour. Biol. Chem.*, 41:367-374, 1920.

2. Nordland, O. S., Host-Parasite Relations in Initiation of Infection. I. Occurrence of Listeriosis in Arctic Mammals, with a note on its possible pathogenesis. *Can. Jour. of Comp. Med. and Vet. Sci.*, 23:393-400, 1959.

3. Nordland, O. S., Host-Parasite Relations in Initiation of Infection. II. Hyperglycemia and Stress in Experimental Infection with *L. monocytogenes*. *Can. Jour. of Comp. Med. and Vet. Sci.*, 24:19-40, 1960.

4. Somogyi, Michael, Determination of Blood Sugar. *Jour. Biol. Chem.*, 160:69-73, 1945.

CONFUSED? which distemper vaccine this week?

Bi V.L. INTRODUCES

Canine Distemper Vaccine

(modified live virus — chick embryo origin)

AND

Infectious Canine Hepatitis Vaccine

(canine origin — inactivated)

Not new — no wild claims, but extensively field tested at our expense, not yours, Doctor!

Dependable Bi V.L. Results

Available from your Bi V.L. Distributors

Bi Vet Laboratories, Inc.

Sales Offices 3324 Fifth Avenue S. Minneapolis 8, Minn.

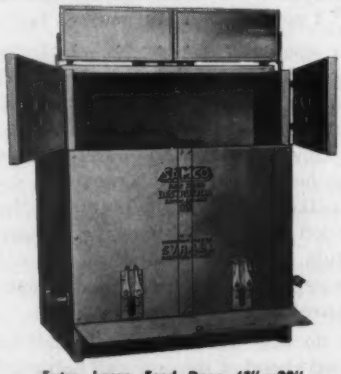
SAMCO

CREMATORY DESTRUCTOR

Gas Fired for

ANIMAL CARCASS CREMATION

(Engineered Special for Veterinary Practitioner)



Extra Large Feed Door 45" x 20"

Capacity 17 Bushel — 2 Burners

100% SAFETY AUTOMATIC

THERMO PILOT VALVE

Each Main Burner with Pilot Light and Timer Shut-off.

GREAT HEAT and FIRE POWER

Smaller Sizes Available

Investigate unique purchase plan for great savings

SYRALL MFG. CO., 511 N. State, Syracuse 3, N.Y.

General Practice Topics

Here each month are published suggestions, tips and notes from VM reporters.

Foot Therapy in Cattle

Foot problems are troublesome for all practitioners. For bovine foot troubles I have adapted an equine founder technic which may be of interest. My attention first was called to this approach by a case with a parting of the hoof wall and sole with underlying infection. I had exhausted myself trying to reach the infection with a hoof knife to no avail when the farmer said why didn't I get my drill and make a hole.

The spot was located by sensitivity and the hole drilled. Exudate was released very effectively and then syringed out with enzymes before packing. Results were excellent. Having several other cows to work on in the herd, especially some with a cauliflower-like growth on the bottom of the sole, I decided to try relieving some pressure and infection. Using a hand drill and a ⅛ in. bit, several holes were drilled around the area involved.

To do this work the leg is half-hitched and tied ahead of the cow and behind. Tranquilizer is sometimes used. With several holes drilled an attempt is made to flush out the lesion by getting the enzyme fluid to go in one hole and out another.

Furacin has been used as after therapy because of its penetrating effect and the container nozzle just fits the drilled hole. The residue is placed on a pack and the foot bandaged.

Each hole is packed with a little cotton to serve as a wick. The holes may be drilled with an electric drill if desired.

Mark R. Crandall, D.V.M.
N.Y.S.V.S.—1960

Hints In Treating Uterine Prolapse

I learned a long time ago that one of the most important things I can tell a client reporting a cow with a prolapse is to wrap the uterus in a towel or sheet and keep it continuously bathed with hot water until I can get there. I have had cases which have been out six or seven hours before arrival and found them some of the easiest replacements simply because the client used the hot water.

The first procedure is to give the cow 500 cc. of a calcium solution to which has been added 4 to 5 cc. of posterior pituitary extract or P.O.P., if the cow is five years old or older. In younger animals I frequently omit the calcium but use the posterior pituitary extract intravenously. Some of these cases are complicated by milk fever and if they are not, the calcium

seems to provide added strength.

The next procedure is to give the epidural anesthetic which I have found by trial and error to be about 5 cc. of a 2% procaine hydrochloride solution. A larger animal may need as much as 6 or 7 cc. but the needle is left in the epidural space and procaine given to effect. There is nothing more discouraging than to have a cow that can readily stand become paralyzed by too much anesthesia.

The next procedure is to remove the placenta which is usually attached. The tail rope is then applied and the animal made to rise. Rubber sheeting which can be obtained from hospital supply stores is far superior to cloth or other material because it is smooth and holds the water. The sheeting supporting the uterus is held by two assistants — I insist on two assistants. The uterus is held at a level with the vaginal opening because it is the weight of the uterus which drags these cows down. Warm water is then poured on the uterus. A mild antiseptic is used in this water and the organ carefully washed.

When actual replacement is started, I like to use a soapy lubricating powder or an obstetricial lubricant. You will often come to a point where the uterus wants to stall. Wrap the uterus with the rubber sheeting and you can exert tremendous pressure with the flat of your hand to squeeze the swelling out and help replacement.

Water Aids Replacement

Water is poured on frequently during replacement and lubricant added as need. Once you have completed replacement, the uterus is carefully returned to its normal position. This is important. To facilitate this procedure and further clean the uterus, syphon a pail of water as hot as you can stand to place your arm in. Syphon the water back and measure the volume returned. You can feel the uterus tighten around your arm and tone is returning.

If you stopped here and did nothing more, no restraint device would be necessary, but farmers expect you to do something. I place two rows of hog rings parallel and vertical to the vulva, well out in the hair line and lace back and forth with strong twine. An additional 3 or 4 cc. of pituitrin is given on completion.

John D. Murry, D.V.M.
Painted Post, N. Y.
N.Y.S.V.S.—1960

Breeding and Health Records

I have found that in routine pregnancy examination and sterility work one of the tools needed is a good simple record system. Without any records you go in circles without progress. The system in use now has done much to promote this type of work with dairymen.

The card in use is designed to handle six years' records. The cervix is graded from one to four to indicate the size and degree of induration. Colored signal tabs work very nicely with this system. By using three colors it is possible to identify the month of breeding in yellow. Two months later at pregnancy examination the yellow tab is removed if the cow is found pregnant. A green tab is placed on the card, identifying the month she is due to freshen. When she does freshen, the green tab comes off and a red tab is used to identify the month she does freshen.

The book is kept up to date and you can tell immediately how cows in the barn have definitely calved, how many cows are open and the month they freshened in, the number bred and not yet diagnosed as pregnant, just by glancing at the tabs. This system is inexpensive and a great time saver. A local printer will supply the cards at approximately two cents each in quantities of 2,000 and a suitable notebook can be obtained at the dime store for 50 cents.

I leave the book right in the barn. A plastic bag like those in which shirts come from the laundry serves as an excellent protective cover for the record book.

Roger Batchelder, D.V.M.
Cortland, N. Y.
N.Y.S.V.S.—1960

...so convenient to administer

BOL-O-TABS

from THE NATIONAL LABORATORIES

The ideal form for easier dosing . . . eliminates mixing and measuring

Rumatone BOL-O-TABS

A complete formula that: (1) aids in correcting stasis of the rumen; (2) aids in relieving toxic gastritis and bloating caused by fermentation or overloading in ruminants. Rumatone is indicated as a Ruminatoric, Antacid, Antiferment and as a mild laxative. Packed 24 Bol-O-Tabs in a carton.

Each **Bol-O-Tab** *Contains:*

Magnesium Hydroxide	225 gr.
Tartar Emetic	10 gr.
Gentian Extract	5 gr.
Sodium Thiosulfate Anhydrous	32 gr.
Cobalt	0.5 gr.
Nux Vomica Extract (Strychnine 0.295 gr.)	4 gr.

Ruminoc BOL-O-TABS

A complete formula that supplies: (1) live rumen organisms; (2) nutritional factors to cause these organisms to flourish; (3) vitamins, nutrients, appetite stimulator. Ruminoc aids stimulation of normal rumen function in calves and cattle following febrile conditions where inappetence is apparent. Packed 25 Bol-O-Tabs in a handy reusable jar.

Each **Bol-O-Tab** *Contains:*

Cobalt Gluconate	1 gr.
Vitamin A	5,000 U.
Vitamin D_2	1,000 U.
Manganese Sulfate	5 gr.
Magnesium Sulfate	5 gr.
Ferrous Fumerate	5 gr.
Calcium Phosphate Dibasic	5 gr.
Lactalbuminate Nutrient	25 gr.
Viable Ruminal Organisms,	not less than 200 billion.

★

THE NATIONAL LABORATORIES CORP.

1721 Baltimore Ave., Kansas City 8, Mo.

Affiliated BIOLOGICS

Serving the Graduate Veterinarian exclusively

Reader's Service

This department will announce new therapeutic items, equipment, services, and literature of interest to veterinarians. All claims made are those of the firms concerned. Send communications to the address noted in copy.

A new service for veterinarians, designed to help them in their PUBLIC RELATIONS with pet owners, is announced by the Gaines Professional Services Department, Battle Creek, Mich.

The service consists of furnishing copies of the publication, "Your Family Pet," to the small animal practitioner for distribution to his clients. Veterinarians or veterinary hospitals who are members of the Gaines Professional Feeder Plan will receive a quantity of "Your Family Pet" without charge. Non-members will be able to obtain copies at cost, as will veterinary societies who may wish to handle copies of the magazine as a group project for their members.

Inquiries concerning "Your Family Pet" should be made to Gaines Professional Services Department, 275 Cliff Street, Battle Creek, Mich.

A new RADIANT HEAT INCUBATOR for the veterinarian's office or laboratory is now available to the profession. Designed for wall or bench-top use, the unit is fully enclosed, requires little maintenance, holds 40 test tubes. The magnifying thermometer attached to the front of the Lucite door permits full visibility of test materials in the chamber at all times. Full information is available from Chicago Surgical & Electrical Company, 3070-82 West Grand Avenue, Chicago 22, Illinois.

A new space-saving TABLE MODEL TWO-WAY RADIO has been designed by General Electric Communication Products Department for use by businesses, governmental agencies and military services. It costs less than larger, floor-model, cabinet-type base stations.

Units up to 60 watts are available in low band (25-54 mc. and 72-76 mc.), up to 50 watts in high band (144-174 mc.) and 15 watts in UHF (450-470 mc.). Depending on the frequency selected, power amplifying equipment can be obtained on an optional basis, providing 250/330 watts output.

Also on an optional basis, units with selective-calling features can be made available, enabling the dispatcher to give a message to a single car or a group of cars. The new table-model equipment may be used to talk to in-plant vehicles, cars or trucks on the road, shoulder-strap portables or shirt-pocket radios on the same frequency. For further information write VETERINARY MEDICINE.

in feed
Terramix® A-B-D-25

oxytetracycline with vitamins

NEW DISPENSING PACKAGE

This new 1 lb. package of Terramix A-B-D-25 (with convenient tear-off label) simplifies your dispensing of this broad-spectrum antibiotic.

broad-spectrum antibiotic therapy PLUS four essential vitamins

each lb. contains:
25 Gm. oxytetracycline HCl activity
2,000,000 units vitamin A
200,000 units vitamin D_3
4 mg. vitamin B_{12}
with expeller soybean oil meal as the diluent.

Also available in 5 lb. canisters.

Sold to Veterinarians Only

Department of Veterinary Medicine, Chas. Pfizer & Co., Inc., New York, N. Y.

Veterinary Wholesalers Elect Officers

During the A.V.M.A. Convention in Denver, The National Veterinary Wholesalers Association, Inc., met at a luncheon on Sunday, August 14, at the Denver Hilton and on Tuesday, August 16 in Executive Session.

The following members from the various regions were present at the Executive Session.

Western Region—Dr. H. C. Burns; Southwestern Region—Mr. Bennie Smith; Southeastern Region—Mr. Frank T. Alexander; Northeastern Region—Mr. C. Guy Stephenson. Also present from the Midwestern Region that has not become a part of the National organization: Messrs. William Butler, Columbus, Ohio and Herbert Holmes, Springfield, Iilinois.

The following officers were elected for the year 1960-61: President, C. Guy Stephenson; Vice President, Frank T. Alexander; Secretary, George McConnell; Treasurer, Jack Miller.

"CAP-CHUR" EQUIPMENT

Automatic projectile type syringe delivered by a specially designed pneumatic rifle.

Excellent for immobilizing, capturing, restraining or treating wild or feral animals.

Effective for animals of all sizes. From one to ten milliliters of any liquid compound can be injected into an animal from distances up to approx. 50 yards.

Reasonably priced. Write for complete information.

PALMER CHEMICAL & EQUIPMENT COMPANY, INC.

1391 Spring Street N. W. TRinity 5-8857

ATLANTA 9, GEORGIA, U.S.A.

INJURED TEATS

SCAB TEATS

STENOSIS

POST-OPERATIVELY

Keep teat open . . . Keep it milking

To maintain unrestricted milk flow and provide medical antisepsis are of prime importance in treating teat troubles. Dr. Naylor Dilators accomplish these 2 objectives with this 2-WAY ACTION:

1. MECHANICAL ACTION . . . gently supports sphincter and teat mucosa — keeps teat open and promotes easier, natural milking. Positive retention in small or large teats.
2. MEDICAL ACTION . . . *Sulfathiazole* released slowly from within the Dilator provides broad antimicrobial protection; combats infection and reduces swelling; minimizes ascending inflammation and promotes healing.

WITH ANTIBIOTICS . . . Saturated with your favorite udder infusion antibiotic, Dr. Naylor Dilators are an ideal vehicle for additional local medication following teat surgery.

Available from your ethical supplier or write Dept. "P"

H. W. NAYLOR CO., Morris, N.Y.

Dr. Naylor

Medicated Teat Dilators

SUPPLIED:

New dispensing vial's — 21's

Labeled packages — 42's

YOU'LL DO BETTER WITH Oster® THE VETERINARIAN'S CLIPPER

Humane, efficient clipping and surgical shaving are easier, faster and more profitable with the smoother-running OSTER. Detachable cutter head permits use of all sizes of cutting blades to do all clipping jobs the professional way.

John Oster MANUFACTURING CO.
5055 N. Lydell Avenue
Milwaukee 17, Wisconsin, U. S. A.

Bi Vet Laboratories Formed

Dr. Earl L. Mundell (Kansas State, 1941) has announced the formation of Bi Vet Laboratories, Inc. of which he is president. He has actively participated in the commercial production of veterinary biologicals since 1946 with a major ethical veterinary house where he was Director of Biological Production.

Dr. Mundell is a past chairman of the Biological Products Committee for the A.V.M.A., a past secretary of the Kansas City Veterinary Medical Association, and a member of the U. S. Livestock Sanitary Association. He served on a special mission to India in 1955 as Veterinary Biological Production Specialist for the Technical Cooperation Administration, USDA and the State Department.

Dr. Mundell indicated that Bi Vet Lab. is dedicated to produce biological products for the veterinary profession. Sales for the new firm will be directed by Mr. Vaughn C. Green.

NEW

EFFECTIVE THERAPY for DIARRHEA and DIARRHEAL ENTERITIS

SULFOCTAN™
with
NATURAL MEAT SUBSTANCE

Each SULFOCTAN tablet contains:

Phthalylsulfacetamide	0.4 Gm. (6 grs.)
Octin mucate (isometheptene mucate)	0.065 Gm. (1 gr.)
Tannalbin (tannin albuminate, dessic.)	0.65 Gm. (10 grs.)

plus natural *meat substance*

dosage: *Dogs* — 1 tablet per 25 pounds of body weight, twice daily, usually for three to five days.

Cats and "toy" dogs — proportionally less, according to size.

N.B. Instruct client to keep SULFOCTAN out of the patient's reach. Dogs really go for SULFOCTAN'S natural meat taste and will eat as much as they can get their teeth into.

SULFOCTAN supplied in bottles of 50 and 250; available only through your veterinary distributor.

Tannalbin, Sulfoctan, Octin®

KNOLL

Veterinary Division

KNOLL PHARMACEUTICAL COMPANY
ORANGE NEW JERSEY

when firm control is essential in diarrheas...

Injectable

DIATHAL

FOR CATS, DOGS, HORSES

prompt anticholinergic blocking action on gut motility and hypersecretions • prevention of excessive fluid loss and dehydration • rapid relief of nausea and vomiting associated with gastroenteritis • wide range antibacterial coverage

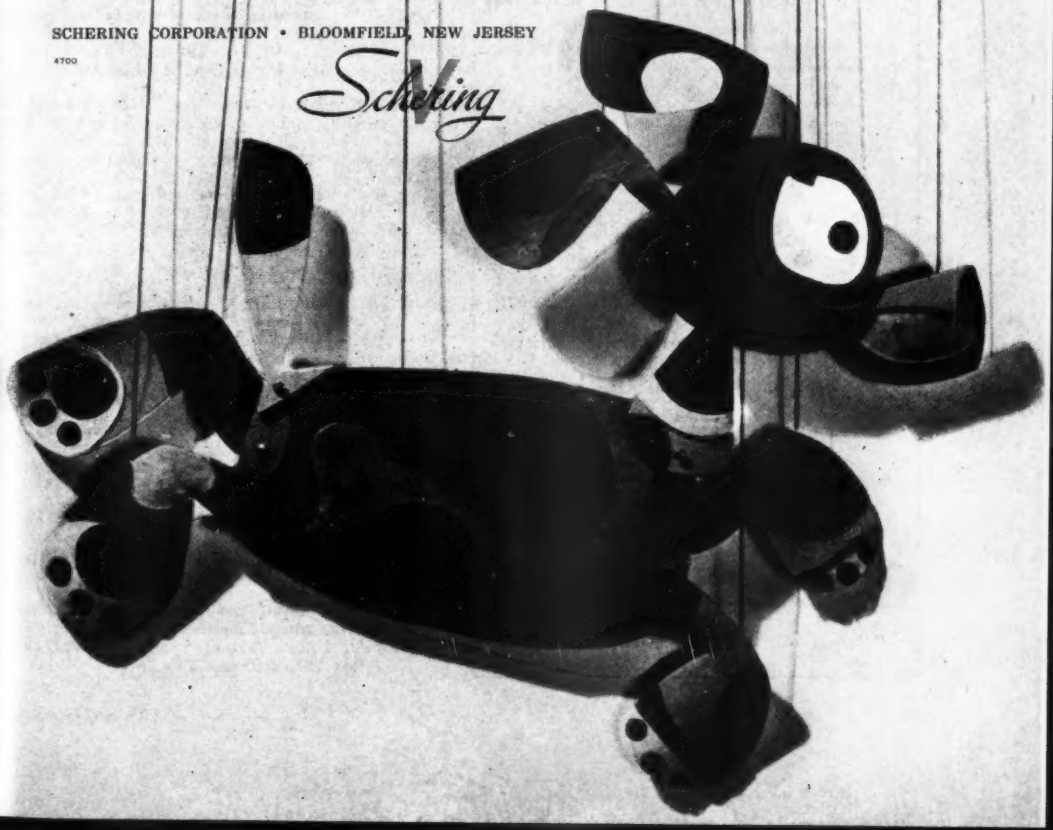
packaging DIATHAL Injection, 10 cc. vials, boxes of 1, 6 and 36.

DIATHAL,® procaine penicillin G in dihydrostreptomycin sulfate solution with diphemanil methylsulfate.

SCHERING CORPORATION • BLOOMFIELD, NEW JERSEY

4700

Schering



Since 1918 CURTS has made Feature Formulations to make practice and dispensing easier and more profitable for VETERINARIANS

SCOUR-PAX

is your answer to both problems in the treatment of enteric infections of young large animals

Packaged in cartons of 100 — 1 ounce sealed plastic packets, each containing:

Neomycin as sulfate	100 mg
Phthalylsulfacetamide	15 gr
Sulfaguanidine	15 gr
Magnesium trisilicate	15 gr
Alumina hydrate	15 gr
Bismuth subcarbonate	6 gr
Pectin	1½ gr
Kaolin	q.s.

The usual treatment for calves and colts is one packet every 12 hours until three doses have been administered, given as drench or suspended in the milk for bucket-fed calves.

Dispensing label only with complete directions on each packet.

Order from your nearest CURTS distributor—or direct.

CURTS Laboratories, Inc.

71 Central Ave. Kansas City 18, Kansas

Veterinary Calendar

Nov. 7-8. **Missouri Veterinary Conference,** 36th annual. Columbia, Missouri. Cecil Elder, chairman.

Nov. 13-15. **Arizona Veterinary Medical Association,** annual meeting. Safari Hotel, Scottsdale, Arizona. Dr. Elmer B. Powell, 1102 S. Scottsdale Road, Scottsdale, Arizona.

Nov. 16. **Central Indiana Veterinary Association,** Fifth Regional Conference on the Nitrofurans in Veterinary Medicine. Sheraton-Lincoln Hotel, Indianapolis, Indiana. Dr. Charles Stengel, president.

Nov. 16-17. **The Midwest Small Animal Association,** regional meeting of the AAHA. Hotel Burlington, Burlington, Iowa. Dr. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Illinois, secretary.

Dec. 5-6. **Kentucky Veterinary Medical Association,** meeting and sterility short course. Phoenix Hotel, Lexington, Kentucky. L. S. Shirrell, D.V.M., 545 East Main, Frankfort, Kentucky, secretary.

Dec. 7-9. **Nebraska Veterinary Medical Association,** annual meeting. Hotel Cornhusker, Lincoln, Nebraska. Bob Garey, secretary.

Dec. 12-14. **American Association of Equine Practitioners,** annual meeting. Westward Ho Hotel, Phoenix, Arizona. Wayne O. Kester, D.V.M., 510 Mile High Center, Denver 2, Colorado.

Jan. 15-17. **Kansas Veterinary Medical Association,** 57th annual convention. Broadview Hotel, Wichita, Kansas. Dr. M. W. Osburn, secretary, 1525 Humboldt, Manhattan, Kansas.

Jan. 18-20. **Michigan State University,** 38th annual Postgraduate Conference for Veterinarians. Michigan State University, College of Veterinary Medicine, East Lansing, Michigan, M. W. Armistead, Dean.

Jan. 23-25. **Minnesota Veterinary Medical Association,** annual meeting. Leamington Hotel, Minneapolis, Minnesota. B. S. Pomeroy, secretary-treasurer, 1443 Raymond Ave., St. Paul 8, Minn.

Jan. 24-25. **Louisiana State University,** 30th annual short course for Louisiana veterinarians. Louisiana State University, Pleasant Hall, Baton Rouge, La. Dr. R. B. Plank, Department of Veterinary Science, chairman.

Jan. 26-28. **Ontario Veterinary Association,** 87th annual meeting. Royal York Hotel, Toronto, Ontario. Dr. R. J. Humble, Ontario Veterinary College, Guelph, Ontario, Canada, chairman.

Feb. 19-21. **Missouri Veterinary Medical Association,** 69th annual meeting. Hotel Statler-Hilton, St. Louis. Paul L. Spencer, secretary, P. O. Box 283, Jefferson City, Mo.

IN BOVINE MASTITIS

CONSISTENT THERAPEUTIC PERFORMANCE

FURACIN® VETERINARY

BRAND OF NITROFURAZONE

A unique, broad-spectrum antibacterial, FURACIN displays decisive effectiveness against mastitis-inducing organisms often resistant to other therapeutic agents. These include such causative pathogens as Staph. aureus, Str. agalactiae, Str. dysgalactiae, Str. uberis, E. coli and Ps. aeruginosa, sensitive to FURACIN.[1,2]

Given early in acute cases, FURACIN acts to prevent severe, irreversible udder damage of chronic mastitis that usually results in fibrosis and permanent loss of the cow's milk-producing potential. Thus, by reversing clinical signs of acute infection and arresting the process of induration, FURACIN helps maintain the integrity of the duct system and re-establish normal milk production levels.

A large animal practitioner who has made FURACIN his primary antimastitis agent, summarizes its principal advantages:

- it is a professional product
- there appears to be no development of bacterial resistance
- it is milk-miscible, thus, seems to be totally distributed throughout the injected quarter
- it does not interfere with healing
- is compatible with other agents[3]

FURACIN SOLUTION VETERINARY SQUEEJET®

Improved intramammary dosage form of FURACIN in a convenient, low-cost single-dose, ready-to-use dispenser.

Contains FURACIN, 0.2%, in a water-miscible base.
Available in SQUEEJETS of 30 cc., boxes of 12.

Note: Milk from cows treated with FURACIN Solution Veterinary should be discarded or used for purposes other than human consumption for at least 24 hours after the last treatment.

FURACIN-PENICILLIN GEL VETERINARY

The broad-spectrum activity of FURACIN is combined with the specific antistreptococcal action of penicillin for additive antibacterial effect.

Contains FURACIN, 2%, and procaine penicillin G (13,333 units per cc.) in peanut oil with aluminum stearate, 3%. In rubber-capped vial of 100 cc., applicator tube of 7.5 cc., boxes of 12.

Note: Milk from cows treated with FURACIN-penicillin Gel should be discarded or used for purposes other than human consumption for at least 72 hours after the last treatment.

References: 1. Kakavas, J. C.; Roberts, H. D. B.; deCourcy, S. J., and Ewing, D. L.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951. 2. Kakavas, J. C.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 323. 3. Jackson, R. A.: A Program for Mastitis Control. Read at the Second Regional Conference on the Nitrofurans in Veterinary Medicine, Madison, Wisconsin, May 28, 1959, pp. 23-26.

Available through your professional veterinary distributor.

NITROFURANS—a *unique* class of antimicrobials—neither antibiotics nor sulfonamides

EATON LABORATORIES, DIVISION OF THE NORWICH PHARMACAL COMPANY, NORWICH, NEW YORK

BARD-PARKER DISINFECTING SOLUTIONS

prolong the useful life of instruments

B-P FORMALDEHYDE GERMICIDE

combines sporicidal and bactericidal potency for hospital use. Protects delicate instruments and keen cutting edges during preoperative preparation. Kills vegetative pathogens and spore formers within 5 min.—the spores themselves within 3 hrs.—TUBERCLE BACILLI WITHIN 5 MIN. Use full strength.

B-P CHLOROPHENYL Disinfectant

where sporicidal potency is not essential—a powerful instrument disinfecting solution for ward, doctor's office, dental clinic. No substitute for B-P GERMICIDE in the operating room—but destroys commonly encountered vegetative bacteria—is free from phenol (carbolic acid)—mercurials. Use full strength.

B-P HALIMIDE Concentrate Disinfectant

for inexpensive instrument disinfection. NO ANTI-RUST TABLETS TO ADD—a CONCENTRATE of low surface tension—excellent penetrating qualities. 1 oz. mixed with 1 gal. of water makes a GALLON of non-corrosive solution. TUBERCULOCIDAL WHEN DILUTED WITH ALCOHOL.

Ask your dealer

B-P BARD-PARKER COMPANY, INC.
DANBURY, CONNECTICUT
A DIVISION OF BECTON, DICKINSON AND COMPANY

B-P-CHLOROPHENYL-HALIMIDE are trademarks

Take Time to Live

The next time the migratory waterfowl season rolls around, veterinary scattergunners will likely get their share. Ergo, this is not a tome on how to sharpshoot. This time we'd like to pass on the following information on how to dress a member of the waterfowl clan — the Canadian honker. The same basic technic can apply to other birds as well.

1. First off, pick the feathers around the neck. A proved method is to grasp small groups of feathers between the thumb and forefinger and turn the hand over in a movement akin to turning a key. You may tear the skin if you try to remove too many feathers at once.

2. At this point, the oil gland in the tail may be removed. Cut the entire gland free, and make sure to remove all the whitish material in the two glands under the skin. The bird may now be singed over a small fire. (Incidently, leaving the feet and head attached up to this point provides handles to work with.)

3. The bird is broken down, providing easy access for removal of internal organs after the lateral incision is made along the base of the rib cage. For large birds, use the end of the table as a fulcrum.

4. Remove the liver, heart and gizzard for giblets. Peel away the muscle from the gizzard sac. Wrap the giblets in wax paper for storage in the body cavity if the bird is to be frozen.

Some like to skin their birds and do a mighty clean job of it. Plucking takes a bit longer, but it seems to be the most popular method and it assures top table fare.

Rambling a bit further, we hasten to take into consideration the problem of those who may want to keep their downed wingers in the field for a few days — without refrigeration. Here field dressing is a must!

Leaving the feathers on provides an excellent insulation and helps retain the cold throughout the warm days. Hang the birds up at night if possible, and leave them hanging in the shade during the day.

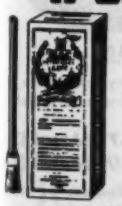
In the field dressing operation, you must remove the internal organs. Also, make an incision in the neck to remove windpipe and crop. If the crop contains food matter, its removal is essential, since spoilage in this area can taint the meat.

If you elect to field dress the bird, remove the gizzard, heart and liver. Use no water to clean the bird! Rather, wipe the body cavity with a clean rag after the insides are removed. As the body cavity dries, a glaze will form and act as a protective film against flies and other insects. On very warm days, it is a good idea to pack the cold birds in a sleeping bag or wrap in canvas to help hold the cold.

The meat of waterfowl can be aged, like any other meat, and several days in the field can actually be beneficial to the final bird in the pan — providing the bird is kept chilled all the way.

No doubt, a good many practitioners in the scattergunning set have missed a few in seasons past. Consolation is in order. The honkers can pour on the coal to the extent of 60 m.p.h. This figure was derived by following one of the wingers in an airplane and checking its speed against that of the plane's. Also, you may be interested to know that the honker's altitude is a mere 29,000 feet — nearly 5½ miles.

M·A·C



Quick relief for Bone, Bursal or Tendon Lameness

Single Bottle.....$2.00
3 and 1 free.....5.00
6 and 2 free.....9.00
12 and 4 free.....17.00
24 and 4 free.....28.00

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

HORSE BLOOD SERUM

25 lb. cans frozen

35¢ lb.

Packed under U. S. Gov. Inspection

Safe . . . Dependable supply

Delivery any place in U. S. in our own refrigerated trucks

(U. S. Inspected Horse Meat)

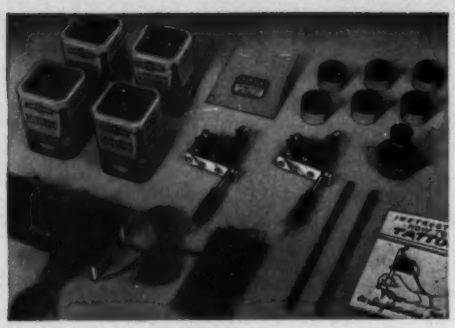
(U. S. Inspected Horse Liver)

Do away with your horse herds and save thousands of dollars yearly!

CENTRAL NEBRASKA PACKING CO.

North Platte, Nebraska

Phone: LE 2-1250 Box 754



ZEIS ELECTRIC TATTOOING INSTRUMENTS

For color impregnation, marking, identification and control of certain skin diseases. Precisely made of best materials, will not tear skin even after repeated passes over same area. Highest grade inks. Safe, simple. WRITE for prices and complete description today.

ZEIS TATTOO INSTRUMENT MFG. CO.
728-L LESLIE AVE. ROCKFORD, ILL.

As Simple as using a Pen

Swine Agalactia Therapy Studied

Noble *et al.* in the Veterinary Record o Jan. 23, 1960 (Vol. 72, No. 4) discussec Combined Corticosteroid and Antibiotic Therapy in Swine Agalactia. They report that metritis and agalactia may go together. The metritis may be due to B. coli infection. There is a thick creamy discharge from the genitalia. Udder and teats show no inflammatory changes but there is agalactia. Parenteral injection of 1.5 gm. of oxytetracycline (terramycin) usually restores milk flow in 18 hours.

When the metritis is due to *C. pyogenes* infection, there is a thick creamy discharge from the genitalia. The udder is hard and temperature elevated. The best results were obtained usually in 24 hours, a 30 mg. injection of prednisolone plus the usual antibiotic therapy. This treatment resulted in quick softening of the udder with return of milk flow so that the litter was not seriously affected.

SUN RAY The "BIG 3" SERIES of CLIPPER BLADE **GRINDERS**

will save you time and money too!

Sun Ray's scientifically designed and engineered grinders assure you of blades correctly ground to professional sharpness every time.

Easy to Use. No previous experience or special skill necessary. Just remove blades from clipper . . . place on grinder — THAT'S ALL! Avoid waiting for blades. Save on periodic grinding costs.

the ROYAL
A complete grinding ensemble . . . . the ultimate in versatility — HONES, GRINDS, SHARPENS & POLISHES (note Protective guard & adjustable grinding rail)

Royal 7–7" Metal Disc & Stone Wheel

the IMPERIAL
Fast grinding stone wheel that guarantees super sharp blades every time (note protective guard ring and adjustable grinding rail)

Imperial 7-7" Stone wheel

the REGULAR
The economy model for excellent honing and polishing results

Model C-7" Metal Disc
Model B-9" Metal Disc

NEW Patent BLADE HOLDER with every Sun Ray grinder
Simplifies grinding — saves wear — prevents abrasions

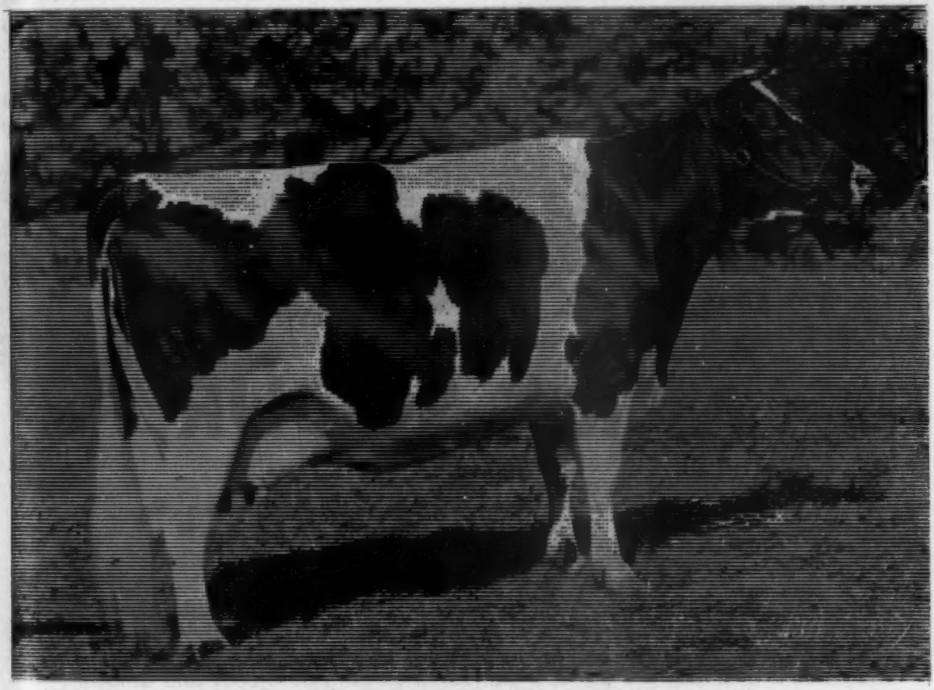
For FREE literature & information ask your dealer, or write

SUN RAY EXPORTING CO., INC.
2404 Fuller St., New York 61, N. Y.

Pasture Plus

A highly palatable combination vitamin and antibiotic concentrate for cattle and ALL other farm animals, prepared especially for the prevention and treatment of Vitamin A and D deficiencies during fair to poor grazing seasons.

Nutritional therapy is an extremely valuable adjunctive treatment. Research Laboratories offers you a complete line of quality products which afford a dependable supply of all vitamins and minerals for you to prescribe.



Holstein—Ancestors of the Holstein roamed the grassy lowlands of Holland and Northern Europe at the time of Christ. They arrived in the New World with the early Dutch settlements. As a result of purebred importation in the 1860's, registry began in 1872. Famous for milk production, the Holstein breed today is one of the most popular of the nation's dairy herds.

better products through Rx research

Research Laboratories, Inc. Saint Joseph, Missouri

sales exclusively to graduate veterinarians

Research Reveals Highly Effective Anthelmintic for Cattle

The results of recently intensive clinical research revealed an anthelmintic that is highly effective in cattle. Individual animals were confined in special stalls and administered different phenothiazine drench formulations for testing. All urinary and fecal excreta were recovered and each excretion was individually analyzed chemically to determine how much of the dose went into the digestive tract and amount of the dose available for killing worms. Dosages were given on an identical basis.

Greater Concentration

Results obtained from the modified formulation were better than that of unmodified drenches generally used. Tests show that modified formulations made with Purified phenothiazine, micronized for maximum efficiency, produced 6 to 8 times more phenothiazine in the digestive tract in a shorter period of time than other drenches. Peak percentages of the purified chemical were obtained in 17 hours post treatment. The unmodified formulations returned a peak percentage of less than .2% 40 hours or later post treatment.

Other effective products are Pro-Brand Kabtin, a non-toxic demulcent for control of diarrhea from dietary or simple digestive causes; Pro-Brand KZ, antiseptic fungicide for ringworms and mycotic dermatoses; Pro-Brand Chap-Et a protective ointment for udders to reduce swelling and soreness. For details write to Pro-Brand Products Company, P. O. Box 4186, Fort Worth, Texas.

Trans-Atlantic Cable To Join Veterinarians

For the first time in the history of veterinary medicine, veterinarians in the United States and England will be joined by Trans-Atlantic cable for the purpose of postgraduate education.

The Trans-Atlantic link, to be held next April, is being arranged by Norden Laboratories, Inc. of Lincoln, Neb., and Smith, Kline & French Laboratories, Philadelphia in cooperation with the AAHA. It will bring together annual meetings of the AAHA in St. Louis, Mo. and the British Small Animal Veterinary Association in London.

Plans are being made to have a panel of specialists from each meeting exchange the latest information on "a topic of timely interest." Audiences at both meetings will be able to hear the discussions by means of special amplification systems.

SK&F has been presenting these unique trans-oceanic conferences for medical audiences for the past three years.

CURTS **AKRA-SCOUR®** CURTS

"Jumbolus"

Sulfonamides combined with accepted coagulants, adsorbents detoxicants and antacids
For the treatment of diarrheas in larger calves and adult cattle

Phthalylsulfacetamide (30 gr)—sulfonamide of choice in enteric infections
Sulfathiazole (30 gr)—routinely used in treatment of scours
Akrodin® (60 gr)—widely used in treatment of bloody scours
Magnesium trisilicate (60 gr)—a preferred detoxicant, adsorbent and antacid
Tannins (100 gr)—adsorbent and coagulant, essential in reducing fluidity of stool
Alumina gel (100 gr)—adsorbent, coagulant, detoxicant and antacid

Suggested dose: 1 **AKRA-SCOUR** "Jumbolus" per 350 pounds body weight (3 per 1000 lb.) the first day, and 1 per 500 pounds the second day. Continue or repeat as necessary.

Fits usual "equine" balling gun. Creased for fractional dosage.

Package: Box of 50 "Jumboluses"

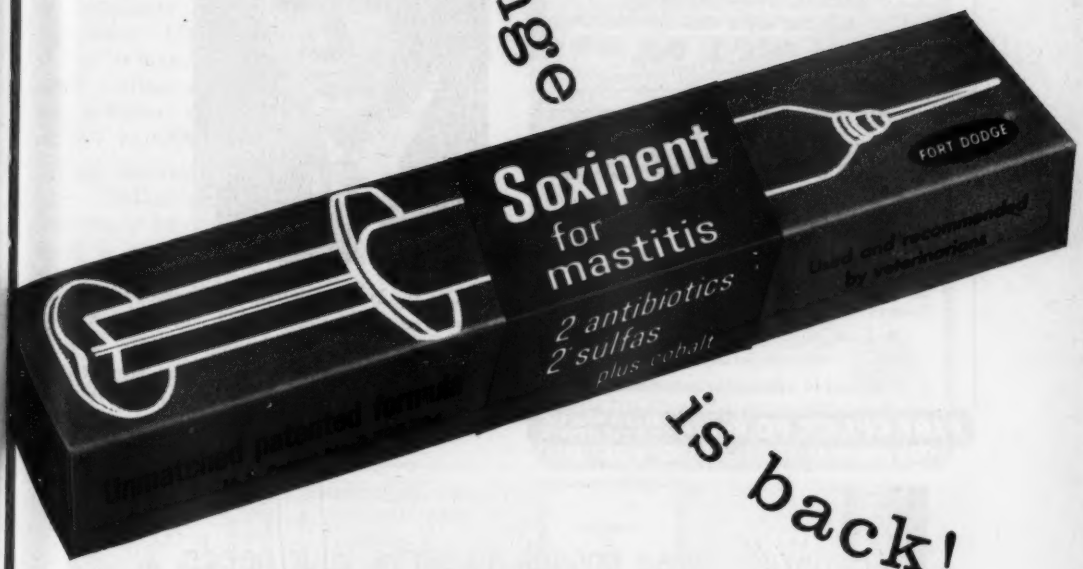
order from your nearest CURTS distributor or direct

CURTS Laboratories, Inc.

Feature Formulations — For Veterinarians — Since 1918

71 Central Avenue Kansas City 18, Kansas

The 28 cc. syringe is back!



and dressed-up in a new eye-catching carton

This newly re-introduced 28 cc. Syringe puts still another SOXIPENT practice-builder in the hands of dairy practitioners. The unmatched Fort Dodge formulation —2 antibiotics, 2 sulfonamides, plus cobalt—is now supplied in 10 cc. tubes, 28 cc. injectors, 100 cc. vials, and 12 cc. and 28 cc. syringes. Supportive advertising appears in *Hoard's* and other farm publications.

FORT DODGE LABORATORIES, Fort Dodge, Iowa

Soxipent* for mastitis

FORT DODGE®

*Trademark

Milk from treated udders should be discarded or used for purposes other than human consumption for at least 72 hours after last treatment.

Try Nelson's For Any
VETERINARY SPECIALTIES
You Need

Send for our latest catalog today.

NELSON LABORATORIES
Box 505, 404 E. 12th St.
Sioux Falls, S. Dak.

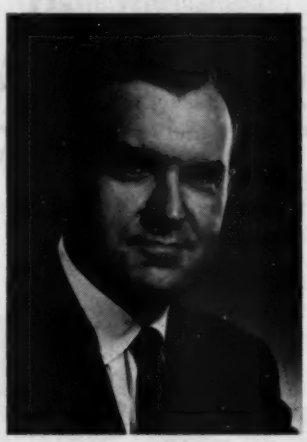
PLASTIC KENNELS

- Durable—last a life time
- Sanitary & easy to clean
- Beautiful in appearance
- Low priced

Write Today for Free Literature and Information

FIBREPLEX P.O. Box 14 · NORWALK, CALIFORNIA

Dr. Armistead Receives Appointment



Dr. W. W. Armistead has been appointed National Consultant in Veterinary Medicine. As National Consultant, Dr. Armistead will serve as advisor to the Surg. General on matters pertaining to the Air Force Veterinary Service.

We're large enough to serve your needs, but small enough to give personal attention

In this day of modern science, the livestock raiser has come to depend more and more on the experienced services of the graduate licensed veterinarian. In turn, veterinarians have come to depend upon GRAIN BELT serums and supplies. GRAIN BELT has built this feeling of dependability over 46 years in the business. The veterinarian knows that GRAIN BELT, and its AFFILIATED line, uses the most modern methods of production to supply quality products. If you are one of the veterinarians who expect top quality and dependable service, ask for GRAIN BELT and AFFILIATED.

Affiliated

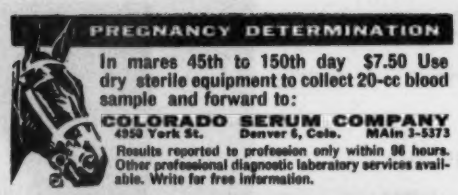
4902 South 33rd Street Omaha, Nebraska

(Continued from left)

Dr. Armistead received his Doctor of Veterinary Medicine degree in 1938 from A&M College of Texas; his Master of Science from Ohio State University in 1950, and his Doctor of Philosophy from the University of Minnesota in 1955.

Dr. Armistead is Dean of the College of Veterinary Medicine, Michigan State University. From 1953-1957 he was Dean of the School of Veterinary Medicine at A&M College of Texas and prior to this was professor of veterinary medicine and surgery at A&M College.

Past president of the American Veterinary Medical Association and the Texas Veterinary Medical Association, Dr. Armistead is also a member of the Michigan Veterinary Medical Association, the Texas Public Health Association, the New York Academy of Sciences, the Conference of Public Health Veterinarians and many other organizations. He also served as editor of the North American Veterinarian from 1950 to 1956.


PREGNANCY DETERMINATION
In mares 45th to 150th day $7.50 Use dry sterile equipment to collect 20-cc blood sample and forward to:
COLORADO SERUM COMPANY
4950 York St. Denver 6, Colo. MAin 3-5373
Results reported to profession only within 96 hours. Other professional diagnostic laboratory services available. Write for free information.

MASON'S New KENNEL RUNS
NOW AVAILABLE
For SMALL ANIMAL HOSPITALS
Quickly Erected - NO POSTS REQUIRED
Can be set on concrete or wood floors or directly upon the ground, joining in, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with GATES BUILT-IN and Lockable Latches.
FREE CATALOG
Send for Free Catalog with Low Direct Factory Prices of Kennel Fences of all kinds, Kennel Doors, Cages and Hospital Equipment.
THE MASON FENCE CO., Box 77, LEESBURG, OHIO

RANFAC
"Finest Professional Instruments Through Research"
Imperial syringes feature:
• Sterilization without dismantling
• Interchangeable barrels and plungers
• Heat-resistant glass
• Accuracy of dosage
Syringes and Needles
Imperial Viking . . .
This popular syringe eliminates danger of breakage by allowing sterilization without dismantling. The syringe is precise and accurate at all times, the barrels and plungers being interchangeable within their respective sizes.
Imperial Vik-O-Matic . . .
This new syringe has all the features of the Imperial Viking with the Vik-O-Matic unit added for accurately calibrated repeat doses. One hand operation. Dosage Regulator insures exact and constant volume delivery. Size 5-10 cc.
Viking Needles
Viking stainless steel needles are guaranteed hard, clean and durable. For best results, use Viking needles with Imperial syringes.
RANFAC a precision line of veterinary products.
Write for new free catalog today
RANDALL FAICHNEY CORP.
BOSTON, MASS., U.S.A.

New, effective treatment for impaired fertility in cows